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VOLUME II: REVISED USER'S GUIDE

THE OAP REGIONAL ECONOMIC MODEL UTILIZATION PHASE I

Prepared for:

Environmental Protection Agency
Office of Air Programs
Research Triangle Park
North Carolina

January 7, 1972

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A revised user's guide of the OAP Economic Model System is presented to facilitate an efficient assessment of control strategies. As described in Volume I, air pollution control strategies are first transformed into a set of appropriate model inputs. The computer program accepts these inputs as "exogenous shocks" to the model system and generates as output, from the model system, measurements of the changes in the key economic variables in the AQCR's under study. The computer simulation of the Economic Model System includes three programs: Program RMS (Regional Model Simulation), Program IOA (Input-Output Analysis), and Program FBE (Feedback Effects). The report also presents control cost estimates.

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1.0 USER'S GUIDE: A GENERAL DESCRIPTION

1.1 Introduction

This is a revised user's guide of the OAP Economic Model System to facilitate an efficient assessment of control strategies.* As described and demonstrated in Volume I, air pollution control strategies are first transformed into a set of appropriate model inputs.** The computer program accepts these inputs as "exogenous shocks" to the model system and generates as output, from the model system, measurements of the "changes" in the key economic variables in the AQCR's under study.

The computer simulation program of the OAP Economic Model System includes three programs, namely, Program RMS (Regional Model Simulation), Program IOA (Input-Output Analysis), and Program FBE (Feedback Effects). As indicated in Volume I, the input-output model and the interregional feedback effects were introduced in order to measure the external market of an AQCR. The main part of the simulation program, consequently, is the Program RMS -- the simulation tool for the Regional Economic Model.

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* CONSAD Research Corporation, An Economic Model System for The Assessment of Effects of Air Pollution Abatement, Volume II, User's Guide to the OAP Economic Model System, May 15, 1971.

** Also, see CONSAD, op. cit., Volume I, Development and Demonstration Phase.

Program RMS has been revised so that the growth rates by AQCRs could be included to provide economic projection of future years. In strategy simulation, cumulative effects over time of any given strategy were also included. At the same time, a new set of control costs which are the preliminary estimates corresponding to the control implied by Clean Air Amendment of 1970 was provided by EPA. These estimates are termed as EPA cost estimates in the rest of the report.

1.2 A General Description

PROGRAM RMS

The Regional Economic Model developed in Volume I consists of five major modules of equations, namely:

a. manufacturing industry equations
b. income and regional economy equations
c. other industry equations
d. labor market equations
e. fuel demand submodel equations

In the development of the Program RMS, linkages between the modules have been rearranged in order to provide an efficient and broad range of strategy simulations. The arrangement of the modules (or block of equations) in the program provides a number of "simulation options" which are related to a number of control inputs corresponding to the control strategy under consideration.

At present, eight simulation options have been included, although additional simulation options can be added, depending upon the need of the user and the full exploration of the model capability. The currently available simulation options are as follows.

Option 1: Industry control cost.

This option takes direct control costs of the manufacturing industry in terms of reduction of profit and investment which increase the cost of production. Control cost data, at present, is the EPA cost estimates by AQCR by year.

Option 2: Benefit by AQCR.

This option takes regional benefits in terms of increase in the regional disposable income by AQCR, resulting from changes in property values, savings in health expenditures, etc. from cleaner air.

Option 3: Local taxation.

This option takes increases in local taxation for possible subsidies for industrial control costs in the implementation plan.

Option 4: Electricity price increase to industry.

This option takes the price increases for the electric power which is being passed to industries.

Option 5: Electricity price increase to the residents.

This option takes price increases for the electric power industry which are being passed to the residents as a reduction in their disposable income.

Option 6: Control cost by two-digit SIC.

This option takes control costs by two-digit SIC manufacturing industries rather than the aggregate control cost by AQCR used in option 1.

Option 7: Fuel price change to two-digit SIC.

This option takes price changes in fuel oil, natural gas, coke and coal as control input.

Option 8: Feedback Effects.

This option takes the output from Program FBE to measure the interregional feedback effects.

Each option consists of modules A, B, C, D, except 7 which includes fuel demand submodel (module E). However, depending upon whether aggregate or two-digit SIC manufacturing sectoring and other simulation specification are available, ten blocks of equations, each related to one module, were included in this Program RMS. A block flow chart for the simulation options available in Program RMS is shown in Figure 1. 1, and Table 1. 1 shows the relation between simulation option module of the Regional Economic Model and equation blocks included in the block flow chart.

For example, in simulation option 1 the industry control costs are read in from EPA cost estimates control input data. This leads to a reduction in both profits and investment of the manufacturing industry thus affecting the entire manufacturing industry module, and in turn regional income, consumption, government sector of module B and other industry of module C and finally labor market of module D. If other simulation options were tried, the sequence will refer to corresponding blocks in the Program and "net" effects will be summarized in the program output. Usually each strategy simulation will involve more than one simulation option. An example of the simulation options involved in a given strategy will be included in Section 2. 3. 2 of this volume (preparation of parameter cards).

PROGRAM IOA

This program has the capability of aggregating a 100 sector U.S. input-output table to a desired number of sectors. Currently,

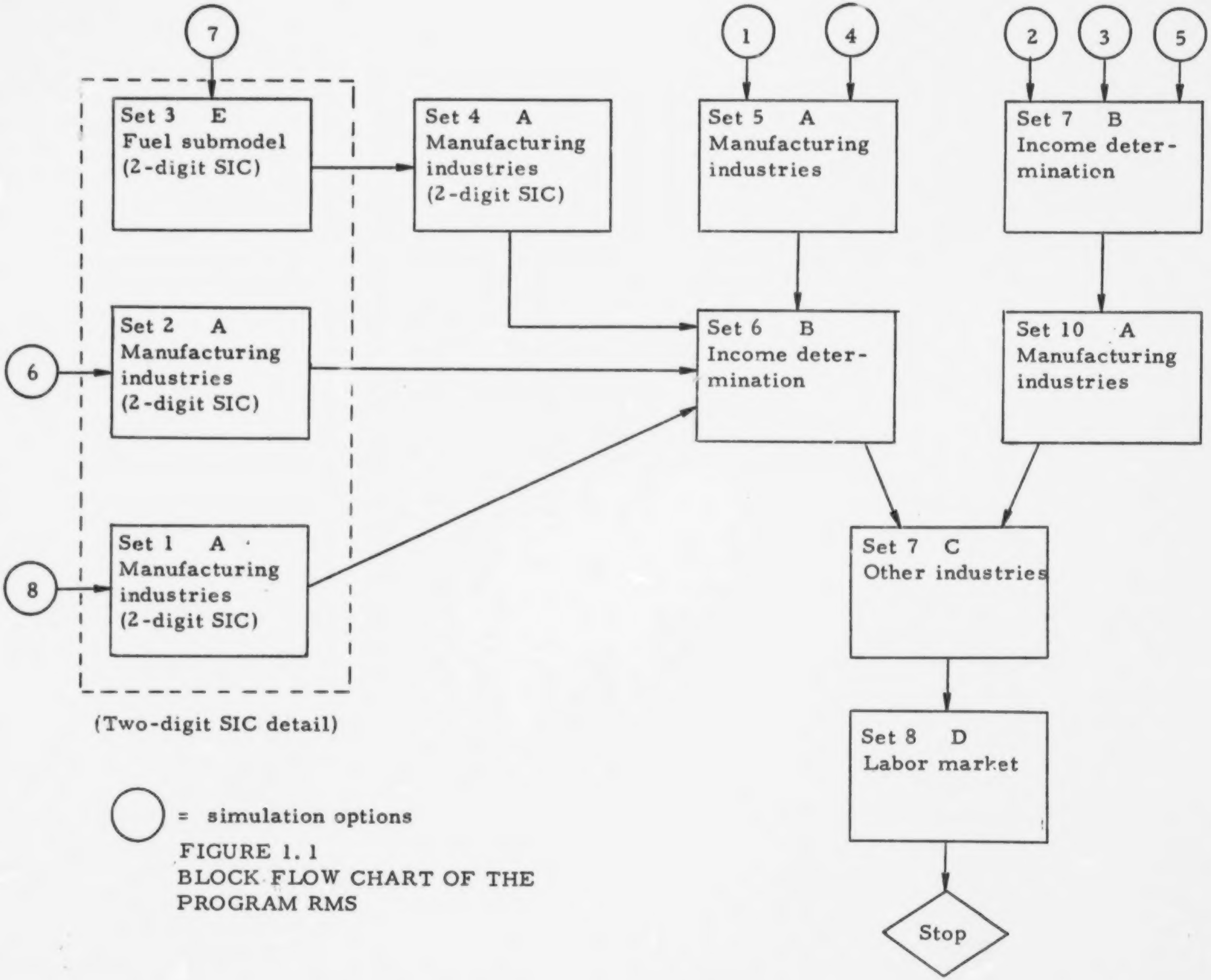

7
1
4
2
3
5
Set 3 E
Fuel submodel
(2-digit SIC)
Set 4 A
Manufacturing
industries
(2-digit SIC)
Set 5 A
Manufacturing
industries
Set 7 B
Income deter-
mination
6
Set 2 A
Manufacturing
industries
(2-digit SIC)
Set 6 B
Income deter-
mination
Set 10 A
Manufacturing
industries
8
Set 1 A
Manufacturing
industries
(2-digit SIC)
Set 7 C
Other industries
(Two-digit SIC detail)
Set 8 D
Labor market
= simulation options
Stop

FIGURE 1.1
BLOCK FLOW CHART OF THE
PROGRAM RMS

Table 1.1. Relations between Simulation Option and Equation Blocks in Program RMS

Equation Blocks in Program RMS \ Simulation Option of Program RMS	1 Industry Control Cost	2 Benefit by AQCR	3 Local Taxa-tion	4 Electricity price in-crease to industry	5 Electricity price in-crease to residentials	6 Control Cost by 2-digit SIC	7 Fuel price change to 2-digit SIC	8 Feedback effects
Block No. 1								A
Block No. 2						A		
Block No. 3							E	
Block No. 4							A	
Block No. 5	A			A				
Block No. 6	B			B		B	B	B
Block No. 7	C	C	C	C	C	C	C	C
Block No. 8	D	D	D	D	D	D	D	D
Block No. 9		A	A		A			
Block No. 10		B	B		B			

Module:

A Manufacturing Industry
B Income and Regional Economy
C Other Industry
D Labor Market
E Fuel Demand Submodel

a 42-sector I-O model has been used (see Appendix D, Volume I of the May 15 Report). The program then provides a new I-O coefficient matrix and the corresponding Leontief inverse matrix with new sectoring. Finally, the program takes changes in final demand, either change by sector or change by average propensity to consume by sector and produces the change in gross domestic product by sector.

Thus, the changes in the final demand, both as a result of costs and benefits of air pollution control, will cause the changes in the gross domestic product (value of shipments by sector). Output from Program IOA becomes the input in the Program FBE for distribution.

PROGRAM FBE

This program takes the output from Program IOA and first transfers the value of shipment into value added by sector and then distributes the feedback effect to each AQCR with the regional market share matrix. The output from Program FBE becomes the input deck for simulation option 8 in the Program RMS.

2.0 PROGRAM RMS (Regional Model Simulation)

2.1 Introduction

Program RMS is a large scale computer simulation program with a 2100 statement program which includes nine subroutines to solve both linear and non-linear simultaneous equation system. For the non-linear system, an iterative algorithm--an extended Newton's method* has been introduced.

Since the program has been designed for a broad range of policy questions, the simulation of any given strategy requiring a proper preparation not only of control input (see Section 2.3) but also the choice of the simulation options appropriate to the strategy.

At the present state, EPA cost estimates by AQCR have been included as basic control input.**

Detailed specification of the program preparation is given in the following sections.

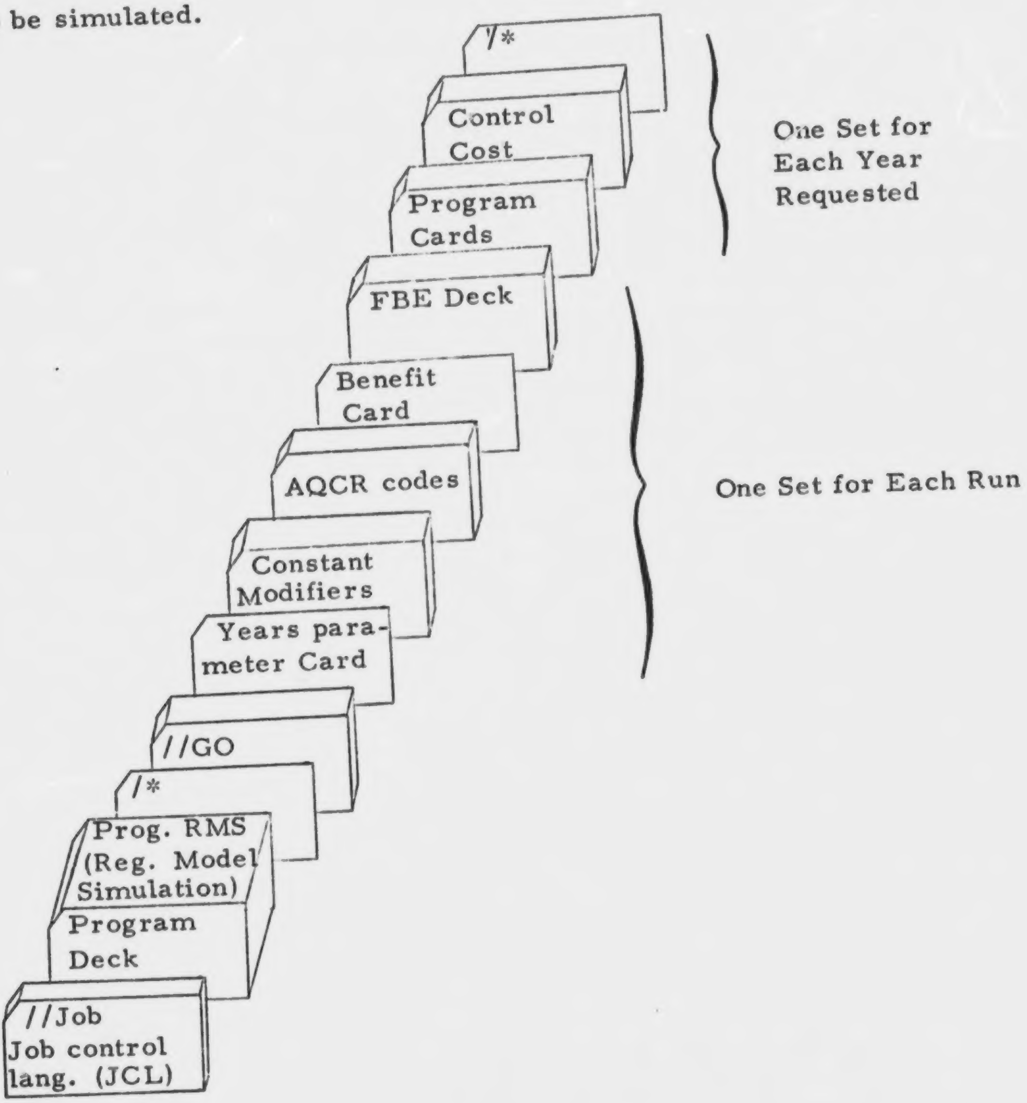
---

* See M. K. Evans and L. R. Klein, The Wharton Econometric Forecasting Model, University of Pennsylvania, 1967, Chapter IV.

** See Appendix.

2.2 Job Deck Set-Up

The Program RMS (Regional Model Simulation) is a 2,100 statement FORTRAN program which uses approximately 392K core and runs 80 seconds on an IBM 360/75, depending upon the scope of the strategy to be simulated.


/*
Control Cost
Program Cards
One Set for Each Year Requested
FBE Deck
Benefit Card
AQCR codes
One Set for Each Run
Constant Modifiers
Years parameter Card
//GO
/*
Prog. RMS (Reg. Model Simulation)
Program Deck
//Job Job control lang. (JCL)

2.3 Data Input Tape

The input section has undergone considerable modification. What was then referred to as the STANDARD DATA INPUT DECK, is now, after some reordering and a few additions, read from a tape. There are two ways of reading through the tape, depending on whether the model is to be used as before, for the 1967 simulation, or if the updated 1970-1980 time series version is decided instead. A detailed description of the contents of the tape follows.

2.3.1 Standard Data Input Tape

The tape includes 14 sets of parameter and input data read from a total of 5,826 cards arranged in the following order.

1. Regional Model Coefficients: 20 cards, one card for each two-digit SIC and one for all manufacturing industries

Cols. 5-10	I5, two-digit SIC code
Cols. 11-20	F10.4, labor share from production function by industry
Cols. 21-30	F10.4 capital share by industry
Cols. 31-40	F10.4, depreciation rate by industry
Cols. 41-50	F10.4, the coefficient of profit in investment function by industry
Cols. 51-60	F10.4, ratio of value-added to capital by industry

2. AQCR Codes and Names: 92 label cards, one for each of the 91 AQCRs for which data was available and one which is the label card for the net effect over all AQCRs studied

Cols. 1-4	I4, AQCR code number (blank for the 92nd card)
Cols. 5-80	19A4, name of AQCR associated with the code in cols. 1-4

3. Relative Codes Used by the Program for the 100 AQCRs: 5 cards

Card 1	20I4, relative codes for AQCRs 1-20*
Card 2	20I4, relative codes for AQCRs 21-40*
Card 3	20I4, relative codes for AQCRs 41-60*
Card 4	20I4, relative codes for AQCRs 61-80*
Card 5	20I4, relative codes for AQCRs 81-100*

4. Fuel Submodel Coefficients: 58 cards

(a) Share coefficients from fuel equation by two-digit SIC (19 cards)

Cols. 9-10	I2, code of the two-digit SIC for which this data applies
Cols. 11-20	F10.5, coefficient of coal
Cols. 21-30	F10.5, coefficient of coke
Cols. 31-40	F10.5, coefficient of oil
Cols. 41-50	F10.5, coefficient of natural gas
Cols. 51-60	F10.5, coefficient of electricity

---

* Code is 0 if no data was available for a given AQCR.

(b) Miscellaneous fuel coefficients by two-digit SIC including one coefficient for all manufacturing industries (20 cards)

Cols. 9-10	I2, code of the two-digit SIC for which this data applies
Cols. 11-20	F10.5, constant determined in the investment equation
Cols. 21-30	F10.5, constant multiplier from the fuel equation
Cols. 31-40	F10.5, coefficient of the energy demand equation

(c) Coefficient relating consumption of electrical energy to value-added by two-digit SIC (19 cards)

Cols. 9-10	I2, code of the two-digit SIC for which this data applies
Cols. 11-20	F10.6, coefficient

5. AQCR Economic Data: 455 cards, five cards for each AQCR for which data was available

First Card:

Cols. 1-10	F10.1, labor force in each AQCR
Cols. 11-20	F10.3, unemployment rate in each AQCR
Cols. 74-76	I3, AQCR code

Second Card

Cols. 1-10	F10.1, 1967 employment in manufacturing industries in each AQCR
Cols. 11-20	F10.1, 1967 wage bill for manufacturing industries

Cols. 21-30	F10.1, 1967 value-added in manufacturing industries
Cols. 41-50	F10.1, 1967 investment in manufacturing industries
Cols. 74-76	I3, AQCR code

Third Card:

Cols. 1-10	F10.0, 1967 total regional personal income
Cols. 11-20	F10.0, 1967 local government revenue
Cols. 21-30	F10.0, 1967 local government expenditures
Cols. 74-76	I3, AQCR code

Fourth Card:

Cols. 1-10	F10.0, 1967 total personal consumption
Cols. 74-76	I3, AQCR code

Fifth Card:

Cols. 1-10	F10.1, 1963 number of employees in manufacturing industries
Cols. 11-20	F10.1, 1963 wage bill for manufacturing incomes
Cols. 21-30	F10.1, 1963 value-added for manufacturing industries
Cols. 74-76	I3, AQCR code

6. Electric Consumption (10 million KWH) by AQCR: 91 cards

Cols. 1-10	F10.0, total electric consumption in each AQCR
Cols. 11-20	F10.0, residential electric power consumptions
Cols. 21-30	F10.0, electric power consumed by manufacturing industries
Cols. 31-40	F10.0, electric power consumed in other industries
Cols. 74-76	I3, code number for the AQCR for which data applies

7. Detailed Two-Digit SIC Data by AQCR: 2,089 cards

(a) Data for 1963

Cols. 1-10	F10.1, number of employees
Cols. 11-20	F10.1, wage bill
Cols. 21-30	F10.1, value-added
Cols. 74-76	I3, AQCR code
Cols. 77-78	I2, two-digit SIC code

A "9's" card follows the 1963 data.

(b) Data for 1967

Cols. 1-10	F10.1, number of employees
Cols. 11-20	F10.1, wage bill
Cols. 21-30	F10.1, value-added
Cols. 41-50	F10.1, investment

Cols. 74-76	I3, AQCR code
Cols. 77-78	I2, two-digit SIC code

A "9's" card follows the 1967 data.

8. Detailed Fuel Information by Two-Digit SIC by AQCR
There are two cards for each AQCR/two-digit SIC combination (2, 058 cards)

Card 1

Cols. 1-10	F10. 0, total cost of fuel consumption (all types)
Cols. 21-30	F10. 0, quantity of coal
Cols. 31-40	F10. 0, cost of coal
Cols. 41-50	F10. 0, quantity of coke
Cols. 51-60	F10. 0, cost of coke
Cols. 74-76	I3, code of the AQCR for which this data applies
Cols. 77-78	I2, two-digit SIC code

Card 2

Cols. 1-10	F10. 0, quantity of oil
Cols. 11-20	F10. 0, cost of oil
Cols. 21-30	F10. 0, quantity of natural gas
Cols. 31-40	F10. 0, cost of natural gas
Cols. 41-50	F10. 1, quantity of electricity
Cols. 51-60	F10. 0, cost of electricity

Cols. 74-76	I3, AQCR code

A "9's" card follows the fuel data.

9. Feedback/Distribution Data by AQCR/Two-Digit SIC: 364 cards

(a) Feedback/distribution to manufacturing industries (3 cards per AQCR = 273 cards)

Card 1

Cols. 1-70	7F10.4, feedback/distribution to two-digit SICs 1-7
Cols. 74-76	I3, Code of the AQCR for which this data applies

Card 2

Cols. 1-70	7F10.4, feedback/distribution to SICs 8-14
Cols. 74-76	I3, code of the AQCR for which this data applies

Card 3

Cols. 1-70	5F10.4, feedback/distribution to SICs 15-19
Cols. 74-76	I3, code of the AQCR for which this data applies

(b) Non-manufacturing industries feedback/distribution by AQCR (91 cards)

Cols. 11-20	F10.3, feedback distribution

10. Growth rates for 1970: 104 cards, two cards for each of the 51 AQCR for which detailed two digit SIC growth rates were available and two codes for national average growth rates by two digit SIC

Card 1

Cols. 1-75	F5.0, growth rates for SIC 20 through SIC 35 (excluding SIC 21)
Cols. 78-80	I3, AQCR code

Card 2

Cols. 1-30	F5.0, growth rates for SIC 36 through SIC 39, plus the average growth rate for all manufacturing industries
Cols. 78-80	I3, AQCR code

11. Growth rates for 1975: 104 cards, same format as above.

12. Growth rates for 1980: 104 cards, same format as above.

13. Total personal income: 153 cards, three cards for each AQCR for which income data was available

Card 1

Cols. 11-20	F10.0, Total personal income for 1970
Cols. 78-80	I3, AQCR code

Card 2

Cols. 11-20	F10.0, total personal income for 1975
Cols. 78-80	I3, AQCR code

Card 3

Cols. 11-20	F10.0, total personal income for 1980
Cols. 78-80	I3, AQCR code

14. Total personal income: 38 cards, one card for each of the AQCRs with code greater than 54 for which no detailed OBE growth factors were available

Cols. 11-20	I10, AQCR code
Cols. 31-40	F10.2, total personal income growth rate, average for 1959-1968

This concludes the description of the nine data sets stored on tape required for any run of RMS.

2.3.2 Input Parameter Cards

1. The Years Parameter Card, for the time series run (with constant modified switch)

Cols. 1-4	Total number of years included
Cols. 6-16	First year (I5)
Cols. 11-15	Second year (I5)
Cols. 16-20	Third year (I5)

and so on until all the years have been stated, up to 11 years.

Col. 80	1 constant modifiers added to the input card deck after this Blank - no constant modifiers; next cards are for testing convergence of city codes

2. The Constant Modifiers are calculated from the difference between the actual and estimated values without control in 1967 and are used to adjust the constant terms in the simultaneous systems in the time series convergence analysis.

Cols. 1-10	F10.2, regional adjustment constant for the government expense equation
Cols. 11-20	F10.2, regional adjustment constant for the consumption equation
Cols. 21-30	F10.2, regional adjustment constant for the wage equation, not currently in use
Cols. 31-40	F10.2, regional adjustment constant for the labor force equation, not currently in use
Cols. 77-78	I2, AQCR number

There are 91 cards in this set, one for each AQCR.

3. AQCR Codes

Cols. 1-5	I5, number of AQCRs for which updated data is needed
Cols. 6-10	I5, AQCR code for the first city
Cols. 11-15	I5, AQCR code for the next city

and so on in cols. of 5 until all the city codes required have been specified.

4. The Benefit Card

Cols. 1-10	F10.2, estimated national benefit from cleaner air in terms of change in total consumption expenditure; in the fast runs this number has been set to either $10 or $15 billion for both the 3 and 5 year runs (in millions on card)
Cols. 11-20	F10.2, estimated national benefit less compact of cost due to government assistance. If there is not government assistance, this number should equal the one in the previous ten columns (in millions)
Cols. 21-30	F10.2, normalizer: if benefit = $10 billion, it equals 2,000. If benefit = $15 billion, it equals 3,000.
Cols. 31-40	F10.2, percentage reduction in manufacturing costs resulting from government assistance

5. FBE Deck. The FBE deck (364 cards) is a set of output from Program FBE where changes in level of benefits were introduced through use of Programs IOA and FBE.

6. Input Parameter Card

All of the following cards are necessary for each year requested.

6.a.1

Card Column	Variable Name	Description
1-4(I4)	INPT(1)	Information for aggregate manufacturing industries desired. (0 or 1) - control input data will be supplied. (0) - No (1) - Yes
5-8(I4)	NOPE	Number of simulation options to be pursued for aggregate manufacturing industries (0, 1, 2, 3, 4, 5).
9-12 + (NOPE - 1) * 4 [NOPE * I4]	LPARA(I), I=1, NOPE	Type of simulation options to be pursued in this run. Specify "NOPE" options. 0 - none 1 - Industry control cost 2 - Benefit by AQCR 3 - Change in local taxation 4 - Electricity-price increase to industry 5 - Electricity-price increase to residential users
N through N + 3	MCNT	If INPT(1) = 1, MCNT specifies the number of cities for which cost changes are given or if INPT(1) = 0, MCNT is specified as 1.

Card Column	Variable Name	Description
(N + 3) through (N + 7) [I4]	INPT(2)	Detailed two digit SIC information to be included (0 or 2) and simulated 0 - not wanted 2 - desired
(n + 8) through (N + 11) [I4]	NOPE1	Number of simulation options to be pursued for detailed two-digit SIC data (0, 1, 2, 3)
(N + 12) through (N + 15) [I4]	LPNT	= 1
(n + 16) through (n + 19) + (NOPE1 - 1) * 4 [NOPE1 * I4]	LPNT2(I)	Types of detailed two-digit SIC simulation options to be pursued, specify "NOPE1" options. 0 - none 1 - control cost by 2 digit SIC. This is simulation option number 6. 2 - impact of fuel price change 3 - national feedback/ distribution affect. This indicates simulation option number 8 is to be pursued.
M through (M + 3)	NUMCIT	The number of cities for which this control card specification applies.

6.a.2

Card Column	Variable Name	Description
		The next five variables control the printout options.
L through (L+3) [I4]	IPRN1	=0 312(A) summary table requested but delete printout of options 1, 4 & 5. =1 Print results of all strategies
(L+4) through (L+7) [I4]	IPRN2	=0 Do not print 312(A) table (i.e., summary table of 1st five strategies
(L+8) through (L+11) [I4]	IRPN3	=0 overrides all preceeding requests and prints out only the net summary tables for all options requested
(L+12) (L+15) [I4]	ISBUG	=1 Turns on debug printout patches =0 Skips option
(L+16) (L+19) I4	ISBUG2	=1 Detailed data tables per year are given =0 Skips option
(L+20) (L+23) [I4]	ICTAB	=1 Convergence tables for simultaneous systems design =0 Skips option

Card Column	Variable Name	Description
(L+24) (L+27) [I4]	IGOU	=1 Impact of costs *with* government assistance =0 Impact *without* government assistance

In addition to the above information, the user should realize that different simulation options may require different control input data.

AN EXAMPLE OF PARAMETER CARD SPECIFICATION

Card Column	Punch	Description
4	1	Aggregate control cost for manufacturing, etc.
8	2	Two simulation options are to be pursued in this strategy simulation for aggregate part of the model system.
12	4	Option 4 is chosen.
16	5	Option 5 is also chosen.
19-20	1	Control input data for 91 AQCR's is included.
24	2	The simulation is to pursue at least one option involving detailed two-digit SIC information.
28	1	1 - by each AQCR
32	1	One option to be pursued for detailed 2-digit SIC information.
36	3	Option 8 is to be pursued.
39-40	91	Two-digit SIC data available for 91 AQCR's.

AN EXAMPLE OF PARAMETER CARD SPECIFICATION

Card Column	Punch	Description
41-48	BLANK	The IPRNS1, IPRNZ printout options are bypassed
49-52	0	Final summary table requested
53-56	BLANK	No debugging switches needed
57-60	BLANK	Avoide update tables
61-64	BLANK	Delete convergence tables
65-68	1	Impact of cost with government assistance requested

6.b. Title Cards. On the next two cards, specify the heading for the final summary table. Example:

Card 1

Cols. 1-80	Five Year Extended Implementation

Card 2

Cols. 1-80	Without Government Assistance

6.c. Percentage Distribution of Benefit Card

Cols. 1-5	F5.0, percentage distribution of total benefit to first year in the time series
Cols. 6-10	F5.0, percentage distribution for the second year (example, 15. for 15%)
Cols. 11-15	F5.0, percentage distribution for the third year
.	.
.	.
.	.
Cols. 35-40	F5.0, total for all numbers in previous columns on this card

6.d. One Blank Card Necessary Here.

The initial parameter card required for each year makes it possible to request different simulation options. As a consequence, the input control data is subject to a corresponding variability. One of the most mechanical adjustments occurs if a limited number of AQCRs are requested in parameter card #1. On response, the control cost input deck should only include data for the specified number of AQCRs.

A more complicated problem results from the fact that the user must provide control cost data for seven of the eight possible options for each year of the run. Furthermore, most changes in option specification must be accompanied by modifications on the cost input sections of the program of which these are two: one for the regional cost options (one through five) and the other for the detailed SIC options (six through eight). These changes are left to the discretion and judgment of the user and are dependent on the type and form of the cost data that may become available. The one restriction is that the regional cost data must preceed the detailed cost data, as can be seen from the example that follows.

CONTROL COSTS DECK: The EPA cost estimates by AQCR has been assembled as input for this program. Two control decks exist:

1. The three year straight implementation deck (1973-75).
2. The five year extended cost distribution deck (1973-77).

This data was set up to accommodate the following options:

1. Manufacturing industries control costs (in the form of stationary combustion and solid waste).

4. Electric power price increase passed to manufacturing industries.

5. Residential price increased on electricity.

6. Industrial cost impact on high emission two-digit SIC.

8. National feedback effect to the region through detailed SICs.

Both the three and the five year cost decks have the following format for each AQCR.

Card 1 (necessary for regional options)

Cols. 1-10	F10.5, investment cost - stationary combustion
Cols. 11-20	F10.5, annual cost - stationary combustion
Cols. 21-30	F10.5, annual cost - solid waste
Cols. 71-73	I3, years (example - 72)
Cols. 74-76	I3, AQCR code

Card 2 (impact on detailed SIC-investment cost and necessary for option number six)

Cols. 1-10	F10.4, investment cost for SIC 20
Cols. 11-20	F10.4, investment cost for SIC 26
Cols. 21-30	F10.4, investment cost for SIC 28
Cols. 31-40	F10.4, investment cost for SIC 29
Cols. 41-50	F10.4, investment cost for SIC 32

Cols. 51-60	F10.4, investment for SIC 33
Cols. 61-70	F10.4, investment cost for all manufacturing industries
Cols. 71-73	I3, year
Cols. 74-76	I3, AQCR code

Card 3 (impact for detailed SICs - annual costs card, necessary for option number six)

Cols. 1-10	F10.4, annual cost for SIC 20
Cols. 11-20	F10.4, annual cost for SIC 26
Cols. 21-30	F10.4, annual cost for SIC 28
Cols. 31-40	F10.4, annual cost for SIC 29
Cols. 41-50	F10.4, annual cost for SIC 32
Cols. 51-60	F10.4, annual cost for SIC 33
Cols. 61-70	F10.4, annual cost for all manufacturing industries
Cols. 71-73	year
Cols. 74-76	AQCR code

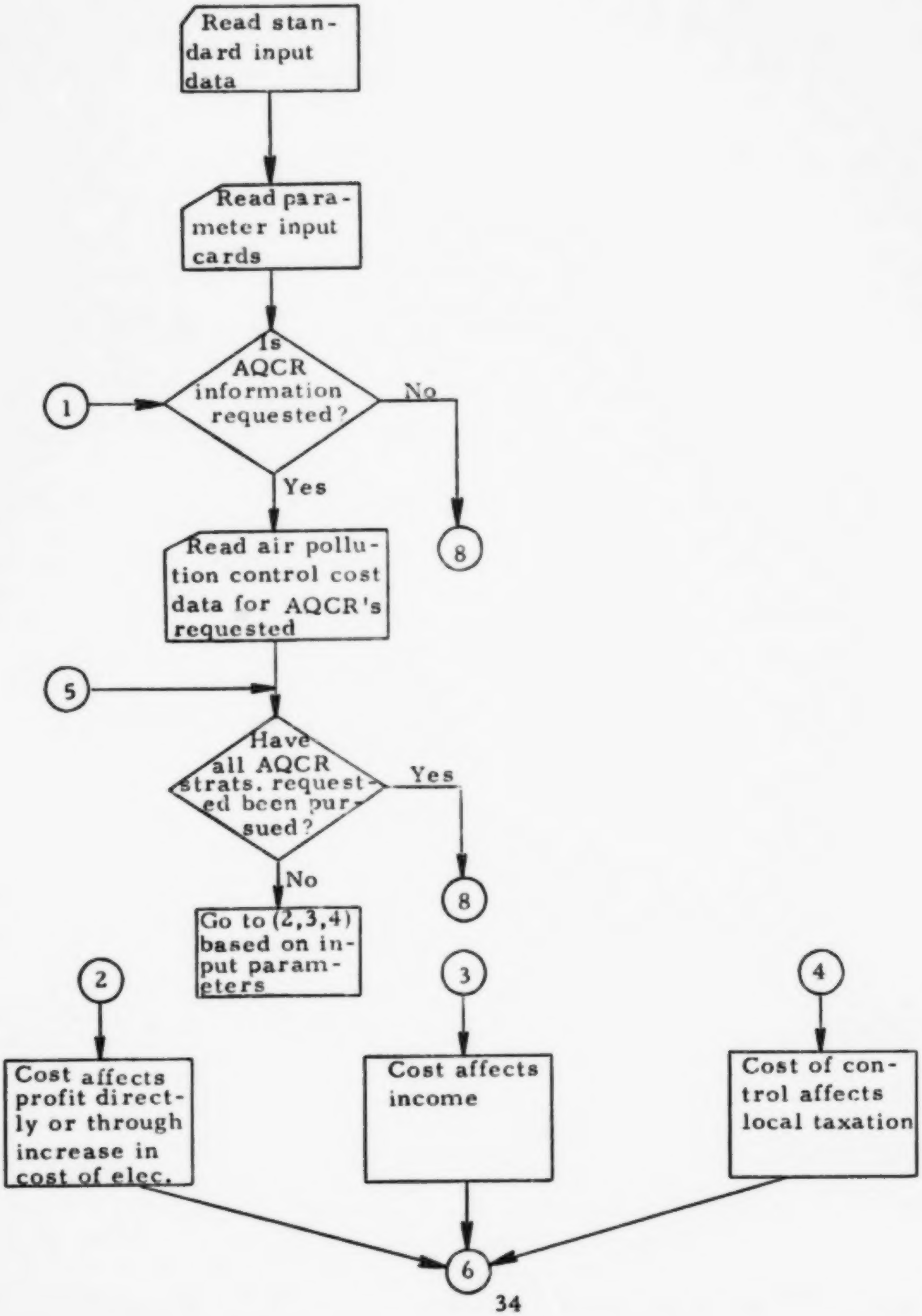
Note that by changing the benefit card, one variable on the parameter card (IGOU =0 or 1), and the second title card. The program has been run with and without government assistance and with corresponding variations in national feedback effects.

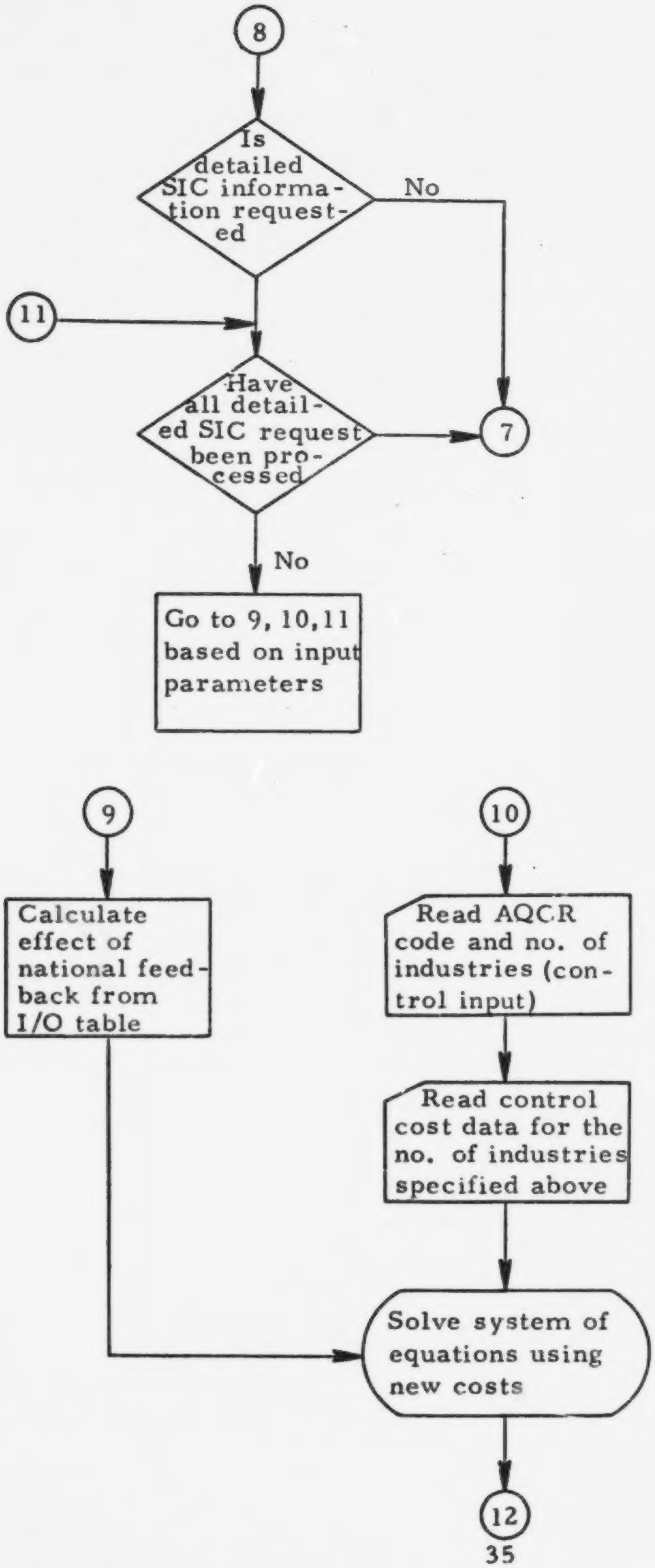
2.4 Description of the Program Deck

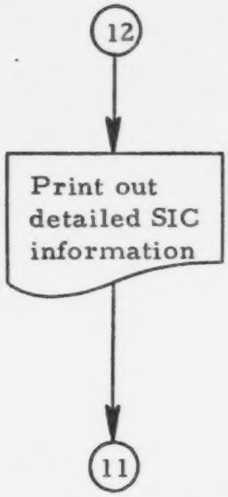
The program RMS consists of a MAINLINE and nine subroutines, PRIN1, VALUE, VALUE1, VALUE2, VALUE3, VALUE4, SIMUL, GRADN and VERT, a total of 1700 cards. The program cards are sequenced along the right-hand edge in columns 73-80 with the prefix RMS.

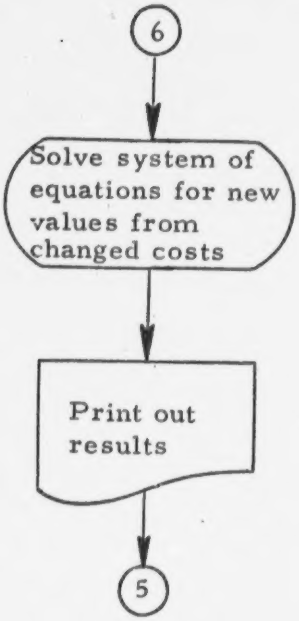
The program begins by reading the standard data input deck from cards. The program parameters are then read from the input parameter card(s). The parameters specify to the program how many and which of the various simulation options have been chosen by the user. The program now reads from the control input deck any specialized data which may be required by the first simulation option which has been specified on the input parameter card(s). The program now develops the specifications for the equation sets which are required for this simulation option. Control is next transferred to subroutine SIMUL which controls the solution of the equation sets. SIMUL calls subroutine VALUE which determines which type of set of equations is to be solved and then calls for the appropriate subroutine (VALUE1, VALUE2, VALUE3 or VALUE4), which actually sets up the complete system of equations in the manner necessary for solution. Control is returned to SIMUL which now calls subroutines GRADN and VERT to do the actual solving of the non-linear parts of the equation system. After the new values for the system have been determined, control is returned to the MAINLINE. The solution procedure involving subroutines SIMUL, VALUE, GRADN and VERT is repeated until all sets of equations needed to implement the desired simulation option have been solved. The program now calls subroutine PRIN1 which prints out the original values, the values after iteration and the percent change. If all of the simulation options specified by the user on the input parameter card(s) have been pursued, the program now prints out a table showing the total effect of the combined results of the simulation options and the program terminates. If all specified options have not been pursued, the program again reads from the control input deck any specialized data required for the next simulation option which has been specified and proceeds as above.

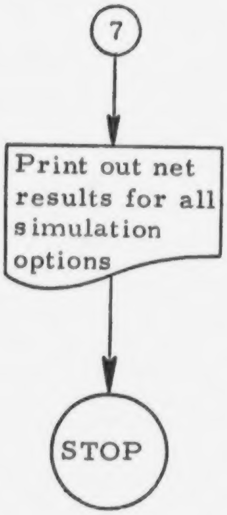
MACRO FLOWCHART
OF RMS


Read standard input data
Read parameter input cards
1
Is AQCR information requested?
No
Yes
8
Read air pollution control cost data for AQCR's requested
5
Have all AQCR strats. requested been pursued?
Yes
No
8
Go to (2,3,4) based on input parameters
2
3
4
Cost affects profit directly or through increase in cost of elec.
Cost affects income
Cost of control affects local taxation
6


8
Is detailed SIC information requested
No
11
Have all detailed SIC request been processed
7
No
Go to 9, 10,11 based on input parameters
9
10
Calculate effect of national feed-back from I/O table
Read AQCR code and no. of industries (control input)
Read control cost data for the no. of industries specified above
Solve system of equations using new costs
12


12
Print out detailed SIC information
11


6
Solve system of equations for new values from changed costs
Print out results
5


7
Print out net results for all simulation options
STOP

2.5 Program RMS (Regional Model Simulation)

```
             C                                                                        RMS00001
             C       **************************************************************  RMS00002
             C       *                                                            *  RMS00003
             C       * A SIMULATION OF ECONOMIC EFFECTS OF AIR POLLUTION CONTROL  *  RMS00004
             C       *             ON AIR QUALITY CONTROL REGIONS                 *  RMS00005
             C       *                    PROGRAM   RMS                           *  RMS00006
             C       *        PREPARED BY CONSAD RESEARCH CORPORATION             *  RMS00007
             C       *                  NOVEMBER 1971                             *  RMS00008
             C       *                                                            *  RMS00009
             C       **************************************************************  RMS00010
             C                                                                        RMS00011
0001                 REAL KJNDX,LJNDX                                                 RMS00012
0002                 DIMENSION  A(20),            AB(91),            ALIT(20)        RMS00013
0003                 DIMENSION  ALPHA(20),        B(91,20),          BETA(20)        RMS00014
0004                 DIMENSION BEN(8)                                                 RMS00015
0005                 DIMENSION  C(92),            CD(92),            CN(92)          RMS00016
0006                 DIMENSION  COFI(91),         COST(91,5),        CTOTD7(91)      RMS00017
0007                 DIMENSION  CTOT67(91,20),    D(20),             D1(91)          RMS00018
0008                 DIMENSION  D2(91),           DELTC(91),         DNBAR(92)       RMS00019
0009                 DIMENSION  DNBARN(92),       DNR(91),           ED(91,5)        RMS00020
0010                 DIMENSION EOLDH(91,20)                                           RMS00021
0011                 DIMENSION  EOLD(91,20,5),    G(92),             GAMA(20,5)      RMS00022
0012                 DIMENSION  GD(92),           GN(92),            HOLD(5)         RMS00023
0013                 DIMENSION  IAQCR(92,20),     IND(20),           INDCI(92,20)    RMS00024
0014                 DIMENSION  INPT(2),          JKEEP(20),         KCITY(100)      RMS00025
0015                 DIMENSION  KEEP(5),          LABEL(10,20),      LKEEP(3,5)      RMS00026
0016                 DIMENSION  LPARA(10),        LPNT2(3),          MCITY(91)       RMS00027
0017                 DIMENSION  PDN(91),          PI(92,20),         PICOEF(20)      RMS00028
0018                 DIMENSION  PICON(20),        PID(92),           PIN(92)         RMS00029
0019                 DIMENSION  PNEWD(91,5),      POLD(91,20,5),     PPID(91)        RMS00030
0020                 DIMENSION  PXD(91),          PXID(91),          PXKD(91)        RMS00031
0021                 DIMENSION  PZD(91),          QBAR(92),          QBARD(92)       RMS00032
0022                 DIMENSION  QBARN(92),        QC(92),            QCD(92)         RMS00033
0023                 DIMENSION  QCN(92),          QM(92),            QMD(92)         RMS00034
0024                 DIMENSION  QMN(92),          QT(92),            QTD(92)         RMS00035
0025                 DIMENSION  QTN(92),          RNET(91),          SUMN(92,20)     RMS00036
             C                                                                        RMS00037
0026                 DIMENSION QGIVEN(7)                                              RMS00038
```

```
         C                                                                        RMS00039
0027           DIMENSION  SUMND(92),         SUMNN(92),         T(92)             RMS00040
0028           DIMENSION  TD(92),            TN(92),            TR(91)            RMS00041
0029           DIMENSION  U(92),             UD(92),            UN(92)            RMS00042
0030           DIMENSION  VK(20),            W(91,20),          WB(91,20)         RMS00043
0031           DIMENSION  WBD(91),           WD(91),            WN(92)            RMS00044
0032           DIMENSION  WT(91,20),         XD(92),            XDN(92)           RMS00045
0033           DIMENSION  XDI(91),           XI(92,20),         XID(92)           RMS00046
0034           DIMENSION  XIN(92),           XK(92,20),         XKD(92)           RMS00047
0035           DIMENSION  XKN(92),           XKT(91,20),        XL(92)            RMS00048
0036           DIMENSION  XLD(92),           XLN(92),           XND(92)           RMS00049
0037           DIMENSION  XNBAR(92),         XNN(92),           XNT(92)           RMS00050
0038           DIMENSION  XX(92,20),         XX63(91,20),       YR(91)            RMS00051
0039           DIMENSION  YY(92),            YYD(92),           YYN(92)           RMS00052
0040           DIMENSION YGROW(38)                                                RMS00053
0041           DIMENSION  ZERO(1656),        ZZ(91,20)                            RMS00054
         C                                                                        RMS00055
         C                                                                        RMS00056
0042           DIMENSION    PERPIN(92),          PERTN(92),          PERSUM(92)   RMS00057
0043           DIMENSION    PERXIN(92),          PERCN(92),          PERQBR(92)   RMS00058
0044           DIMENSION    PERXKN(92),          PERDNB(92),         PERQTN(92)   RMS00059
0045           DIMENSION    PERXDN(92),          PERXNN(92),         PERQCN(92)   RMS00060
0046           DIMENSION    PERYYN(92),          PERXLN(92),         PERQMN(92)   RMS00061
0047           DIMENSION    PERGN(92),           PERUN(92)                        RMS00062
         C                                                                        RMS00063
0048           DIMENSION  PERRC(1564)                                             RMS00064
         C                                                                        RMS00065
0049           DIMENSION PMED(20,5),KGOR(20,5)                                    RMS00066
         C                                                                        RMS00067
0050           DIMENSION XLH(92),UH(92),SUMNH(92,20),WBH(92,20),XXH(92,20)        RMS00068
0051           DIMENSION XIH(92,20),YYH(92),TH(92),GH(92),CH(92),XNTH(92)         RMS00069
0052           DIMENSION XNBAH(92),QTH(92),QMH(92),QCH(92),QBARH(92),XINC(60,3)   RMS00070
0053           DIMENSION GRFAC(100,20,3),IYEAR(11),ICHO(91),XXT(92,20)            RMS00071
         C                                                                        RMS00072
         C                                                                        RMS00073
0054           DIMENSION SCC1(3),SCC2(5)                                          RMS00074
         C                                                                        RMS00075
         C                                                                        RMS00076
```

```
0055              DIMENSION FUDGE(91,4)                                               RMS00077
            C                                                                         RMS00078
            C                                                                         RMS00079
0056              DIMENSION HHI(7),HHA(7)                                             RMS00080
0057              DIMENSION ISPIN(7)                                                  RMS00081
0058              DIMENSION TITLE(20,2)                                               RMS00082
            C                                                                         RMS00083
0059              COMMON / ZEROT / PIN,XIN,XKN,XDN,YYN,GN,TN,CN,DNBARN,XNN,XLN,WN,    RMS00084
                 1                 UN,SUMNN,QBARN,QMN,QCN,QTN                         RMS00085
            C                                                                         RMS00086
0060              COMMON /BLOXK1/   PERPIN,PERTN,PERSUM,PERXIN,PERCN,PERQBR,          RMS00087
                 1                  PERXKN,PERDNB,PERQTN,PERXDN,PERXNN,PERQCN,        RMS00088
                 2                  PERYYN,PERXLN,PERQMN,PERGN,PERUN                  RMS00089
            C                                                                         RMS00090
0061              COMMON /FAT/ F(1000),LSTORE,KPIST,ARAB(10),LCHECK                   RMS00091
            C                                                                         RMS00092
0062              COMMON /SENS/ ICTAB,NBEFOR,NEWCIT                                   RMS00093
0063              COMMON /CAT/ Z(20,20)                                               RMS00094
            C                                                                         RMS00095
0064              COMMON /SIM/ M1,M2,MCASES,Y(1000),X(1000),MARK,LVAR,MKEEP           RMS00096
            C                                                                         RMS00097
0065              COMMON / BUG / ISBUG,LREAD,LWRIT                                    RMS00098
0066              COMMON /BUGG/ IPRN1,IPRN2,IPRN3                                     RMS00099
            C                                                                         RMS00100
0067              COMMON / CPRIN / PXD, PXID, PXKD, PPID, CTOTD7, PDN, CTOT67         RMS00101
                 1  ,EOLD,ED,POLD,PNEWD                                               RMS00102
            C                                                                         RMS00103
0068              COMMON /APRIN/PI,PID,XI,XID,XK,XKD,XX,XD,C,CD,YY,YYD,SUMN,SUMND,    RMS00104
                 1               XNBAR,DNBAR,XNT,XND,U,UD,XL,XLD,G,GD,T,TD,QT         RMS00105
                 2              ,QTD,QC,QCD,QM,QMD,QBAR,QBARD                         RMS00106
            C                                                                         RMS00107
0069              COMMON /PRITT/ TITLE,BENGOV                                         RMS00108
0070              COMMON/NPRIN/ LABEL,MCITY,KCITY,      LSTRAT,INPT,IKSW,IHELP,IFEEDRMS00109
0071              COMMON / IPRIN /INTT,LPNTT  ,JYEAR,IAQCR,IJCIT,MIN,IA312            RMS00110
            C                                                                         RMS00111
            C                                                                         RMS00112
            C                                                                         RMS00113
            C                                                                         RMS00114
```

```
0072          EQUIVALENCE (ZERO(1),PIN(1))                                        RMS00115
        C                                                                         RMS00116
0073          EQUIVALENCE  (PERRC(1),PERPIN(1))                                   RMS00117
        C                                                                         RMS00118
0074          EQUIVALENCE (INDCI(1),XX(1))                                        RMS00119
        C                                                                         RMS00120
        C                                                                         RMS00121
        C                                                                         RMS00122
0075          DATA LKEEP/ 3,1,1,4,3,2,5,4,3,0,5,4,0,0,5/                          RMS00123
0076          DATA SCC1/'   Y','  'G',      '   C'/                               RMS00124
0077          DATA SCC2/' N-T','   L','   W','   U','SUMN'/                       RMS00125
        C                                                                         RMS00126
        C                                                                         RMS00127
0078          DATA ISPIN/20,26,28,29,32,33,40/                                    RMS00128
        C                                                                         RMS00129
0079          DATA JKEEP/20*2/                                                    RMS00130
0080          DATA PMED,KGOR/100*0.0,100*0/                                       RMS00131
0081          DATA FUDGE/364*0.0/                                                 RMS00132
        C                                                                         RMS00133
0082          ADJUST = 2000.                                                      RMS00134
0083          NOX = -1                                                            RMS00135
0084          LLLLL = 0                                                           RMS00136
0085          LLKKK = 0                                                           RMS00137
0086          LSTRAT = 1                                                          RMS00138
0087          LPNTT = 0                                                           RMS00139
0088          INTT = 0                                                            RMS00140
        C                                                                         RMS00141
        C      BEWARE ... SIC AT A TIME WILL BE DIFF.                             RMS00142
        C                                                                         RMS00143
0089          DO 106 I = 1,1656                                                   RMS00144
0090      106 ZERO(I) = 0.0                                                       RMS00145
0091          DO 6340 I=1,1564                                                    RMS00146
0092     6340 PERRC(I) = 1.0                                                      RMS00147
0093          ISBUG = 1                                                           RMS00148
0094          LREAD = 5                                                           RMS00149
0095          LWRIT = 6                                                           RMS00150
0096          AIA =    0./897.                                                    RMS00151
0097          AAA = 960./1145.                                                    RMS00152
```

```
              C                                                                         RMS00153
 0098               IIOCS = 1                                                           RMS00153
 0099               IIOCS = 0                                                           RMS00154
              C                                                                         RMS00155
 0100               ISBUG2 = 1                                                          RMS00156
 0101               ISBUG2 = 0                                                          RMS00157
              C                                                                         RMS00158
 0102               IA312 = 0                                                           RMS00159
 0103               IA312 = 1                                                           RMS00160
              C                                                                         RMS00161
 0104               LTAPE = 9                                                           RMS00162
 0105               IDYEAR = 1967                                                       RMS00163
 0106               JYEAR = -2                                                          RMS00164
 0107               IDYEAR = 1971                                                       RMS00165
 0108               IFEED = 0                                                           RMS00166
 0109           405 FORMAT(20A4)                                                        RMS00167
 0110           410 FORMAT(20I4)                                                        RMS00168
 0111           440 FORMAT(10X,5F10.4)                                                  RMS00169
 0112               DO 404 I = 1,91                                                     RMS00170
 0113               DO 404 J = 1,20                                                     RMS00171
 0114               XX(I,J) = 0.0                                                       RMS00172
 0115               XXH(I,J) = 0.0                                                      RMS00173
 0116               DO 61 K=1,5                                                         RMS00174
 0117            61 EOLD(I,J,K) = 0.0                                                   RMS00175
 0118           404 CONTINUE                                                            RMS00176
              C                                                                         RMS00177
              C                                                                         RMS00178
              C     GENERAL INPUT VARIABLES                                             RMS00179
              C                                                                         RMS00180
              C                                                                         RMS00181
 0119               DO 430 I = 1,20                                                     RMS00182
 0120               READ (LTAPE,440) ALPHA(I),BETA(I),D(I),PICOEF(I),VK(I)              RMS00183
 0121               IF (ISBUG) 430,430,420                                              RMS00184
 0122           420 WRITE(LWRIT,440) ALPHA(I),BETA(I),D(I),PICOEF(I),VK(I)              RMS00185
 0123           430 CONTINUE                                                            RMS00186
 0124               DO 460 I = 1,92                                                     RMS00187
 0125               READ(LTAPE,461)        (IAQCR(I,J),J=1,20)                          RMS00188
 0126           458 FORMAT (1H1)                                                        RMS00189
                                                                                        RMS00190
 0127          459 FORMAT(1H1,//1H  ,'AQCR S FOR WHICH DATA WAS AVAILABLE FOR THIS STRMS00191
                  1UDY',/)                                                          RMS00192
 0128          460 CONTINUE                                                         RMS00193
 0129          461 FORMAT (I4,19A4)                                                 RMS00194
 0130              WRITE (LWRIT,459)                                                RMS00195
 0131              KITTY = 0                                                        RMS00196
 0132              DO 464 I = 1,91                                                  RMS00197
 0133              WRITE (LWRIT,462) ( IAQCR(I,J),J=1,20)                           RMS00198
 0134              KITTY = KITTY + 1                                                RMS00199
 0135              IF (KITTY-31) 464,463,463                                        RMS00200
 0136          462 FORMAT(1H ,23X,I3,2X,19A4)                                       RMS00201
 0137          463 KITTY = 0                                                        RMS00202
 0138              WRITE (LWRIT,458)                                                RMS00203
 0139          464 CONTINUE                                                         RMS00204
 0140              WRITE (LWRIT,458)                                                RMS00205
             C                                                                      RMS00206
 0141              READ(LTAPE,410) (KCITY(I),I=1,100)                               RMS00207
 0142              IF(LLKKK.EQ.1) GO TO 720                                         RMS00208
 0143              LLKKK = 1                                                        RMS00209
 0144              READ(LTAPE,490) ((GAMA(IKIT,JKIT), JKIT = 1,5), IKIT = 1,19)     RMS00210
 0145          490 FORMAT(10X,5F10.5)                                               RMS00211
 0146              DO 492  KIT = 1,20                                               RMS00212
 0147              READ(LTAPE,491) PICON(KIT), A(KIT), ALIT(KIT)                    RMS00213
 0148          491 FORMAT(10X,3F10.5)                                               RMS00214
 0149          492 CONTINUE                                                         RMS00215
 0150              DO 799 KIT = 1,19                                                RMS00216
 0151          799 READ(LTAPE,798) AB(KIT)                                          RMS00217
 0152          798 FORMAT(10X,F10.6) .                                              RMS00218
 0153              IF(IDYEAR.EQ.1967) GO TO 9404                                    RMS00219
             C                                                                      RMS00220
             C      1970-1980 INPUT SEGMENT                                         RMS00221
             C                                                                      RMS00222
             C                                                                      RMS00223
 0154              DO 450  I = 1,91                                                 RMS00224
 0155              READ(LTAPE,445) XLH(I),UH(I),SUMNH(I,20),WBH(I,20),XXH(I,20),    RMS00225
                  1  XIH(I,20),YYH(I),TH(I),GH(I),CH(I)                             RMS00226
 0156              IF (ISBUG) 447,447,444                                           RMS00227
 0157          444 WRITE(LWRIT,446)XLH(I),UH(I),SUMNH(I,20),WBH(I,20),XXH(I,20),    RMS00228
```

```
                1  XIH(I,20),YYH(I),TH(I),GH(I),CH(I)                                  RMS00229
0158         445 FORMAT(F10.1,F10.3,/,3F10.1,10X,F10.1,/,3F10.0,/,F10.0,/,80X)        RMS00230
0159         446 FORMAT(1H ,F10.1,1X,F10.3,1X,4(F10.1,1X),4(F10.0,1X))                RMS00231
0160         447 XNTH(I) = (1.0-UH(I))*XLH(I)                                          RMS00232
0161             XNBAH(I) = XNTH(I)-SUMNH(I,20)                                        RMS00233
0162         450 CONTINUE                                                              RMS00234
0163             DO 470  I = 1,91                                                      RMS00235
0164             READ(LTAPE,466) QTH(I),QCH(I),QMH(I),QBARH(I)                         RMS00236
0165             WRITE(LWRIT,466) QTH(I),QCH(I),QMH(I),QBARH(I)                        RMS00237
0166         465 FORMAT(1H ,20I5)                                                      RMS00238
0167         470 CONTINUE                                                              RMS00239
0168         466 FORMAT(4F10.0)                                                        RMS00240
0169        5993 READ(LTAPE,5994)  XKIT,KIND                                           RMS00241
0170        5994 FORMAT (F10.1,66X,I2)                                                 RMS00242
0171             IF(KIND-99) 5993,5996,5996                                            RMS00243
0172        5996 READ(LTAPE,5997) XKIT,XKIT1,XKIT2,XKIT3,ICT,KIND                      RMS00244
0173        5997 FORMAT(3F10.1,10X,F10.1,23X,I3,I2)                                    RMS00245
0174             IF (KIND-99) 5998,5999,5999                                           RMS00246
0175        5998 KIND = KIND-20+(20/KIND)                                              RMS00247
0176             ICITY = KCITY(ICT)                                                    RMS00248
0177             IF (ICITY.EQ.0)  GO TO 5996                                           RMS00249
0178             WBH(ICITY,KIND)  = XKIT1                                              RMS00250
0179             SUMNH(ICITY,KIND) = XKIT                                              RMS00251
0180             XXH(ICITY,KIND) = XKIT2                                               RMS00252
0181             XIH(ICITY,KIND) = XKIT3                                               RMS00253
0182             GO TO 5996                                                            RMS00254
           C                                                                           RMS00255
           C*******************************************************************************RMS00256
           C                                                                           RMS00257
           C       1967 INPUT SECTION                                                  RMS00258
           C                                                                           RMS00259
           C                                                                           RMS00260
0183        9404 CONTINUE                                                              RMS00261
0184             DO 9450 I=1,91                                                        RMS00262
0185             READ(LTAPE,9445) XL(I),U(I),SUMN(I,20),WB(I,20),XX(I,20),             RMS00263
                1XI(I,20),YY(I),T(I),G(I),C(I),      XNT(I),    WT(I,20),XX63(I,20)RMS00264
0186             IF(ISBUG) 9447,9447,9444                                              RMS00265
0187        9444 WRITE(LWRIT,9446)XL(I),U(I),SUMN(I,20),WB(I,20),XX(I,20),             RMS00266
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              1XI(I,20),YY(I),T(I),G(I),C(I),      XNT(I),    WT(I,20),XX63(I,20)RMS00267
 0188    9447 PI(I,20) = XX(I,20)-WB(I,20)                                        RMS00268
 0189         XK(I,20) = XX(I,20)/VK(20)                                          RMS00269
 0190         W(I,20) = WB(I,20)/SUMN(I,20)                                       RMS00270
 0191         WT(I,20) = WT(I,20)/XNT(I)                                          RMS00271
 0192         XNT(I) = (1.0-U(I))*XL(I)                                           RMS00272
 0193         XNBAR(I) = XNT(I)-SUMN(I,20)                                        RMS00273
 0194    9450 CONTINUE                                                            RMS00274
 0195    9445 FORMAT(F10.1,F10.3,/,F10.1,F10.1,F10.1,10X,F10.1,/,                 RMS00275
             13F10.0,/, F10.0,/,F10.1,F10.1,F10.1,10X,F10.1)                      RMS00276
 0196    9446 FORMAT(1H ,F10.1,F10.3,/,F10.1,F10.1,F10.1,10X,F10.1,/,             RMS00277
             13F10.0,/, F10.0,/,F10.1,F10.1,F10.1,10X,F10.1)                      RMS00278
        C                                                                         RMS00279
 0197         DO 9470 I=1,91                                                      RMS00280
 0198         READ(LTAPE, 466) QT(I),QC(I),QM(I),QBAR(I)                          RMS00281
 0199         IF(ISBUG) 9470,9470,9465                                            RMS00282
 0200    9465 WRITE (LWRIT,467) QT(I),QC(I),QM(I),QBAR(I)                         RMS00283
 0201    9470 CONTINUE                                                            RMS00284
 0202     467 FORMAT(1H ,4F10.0)                                                  RMS00285
        C                                                                         RMS00286
 0203    9993 READ(LTAPE,9994) XKIT, XKIT1, XKIT2, ICT, KIND                      RMS00287
 0204         IF(KIND - 99) 9995,9996,9996                                        RMS00288
 0205    9995 KIND = KIND - 20 + (20 / KIND)                                      RMS00289
 0206         ICITY = KCITY(ICT)                                                  RMS00290
 0207         IF(ICITY .EQ. 0) GO TO 9993                                         RMS00291
 0208         WT(ICITY,KIND) = XKIT1 / XKIT                                       RMS00292
 0209         XX63(ICITY,KIND) = XKIT2                                            RMS00293
 0210         XKT(ICITY,KIND) = XKIT2 / VK(KIND)                                  RMS00294
 0211         GO TO 9993                                                          RMS00295
 0212    9996 READ(LTAPE,9997) XKIT, XKIT1, XKIT2, XKIT3, ICT, KIND               RMS00296
 0213         IF(KIND - 99) 9998,5999,5999                                        RMS00297
 0214    9998 KIND = KIND - 20 + (20 / KIND)                                      RMS00298
 0215         ICITY = KCITY(ICT)                                                  RMS00299
 0216         IF(ICITY .EQ. 0) GO TO 9996                                         RMS00300
 0217         W(ICITY,KIND) = XKIT1 / XKIT                                        RMS00301
 0218         WB(ICITY,KIND) = XKIT1                                              RMS00302
 0219         SUMN(ICITY,KIND) = XKIT                                             RMS00303
 0220         PI(ICITY,KIND) = XKIT2 - XKIT1                                      RMS00304
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      XK(ICITY,KIND) = XKIT2 / VK(KIND)                                 RMS00305
      XX(ICITY,KIND) = XKIT2                                            RMS00306
      XI(ICITY,KIND) = XKIT3                                            RMS00307
      GO TO 9996                                                        RMS00308
 9994 FORMAT(3F10.1,43X,I3,I2)                                          RMS00309
 9997 FORMAT(3F10.1,10X,F10.1,23X,I3,I2)                                RMS00310
C                                                                       RMS00311
C***********                                                            RMS00312
C                                                                       RMS00313
 5999 CONTINUE                                                          RMS00314
      READ(LTAPE,6000) CT,(X(I),Y(I),I=1,2),ICT  ,KIND,(X(I),Y(I),I=3,5)RMS00315
      IF (KIND-99) 6002,6006,6006                                       RMS00316
 6002 KIND = KIND - 20 + (20 / KIND)                                    RMS00317
      ICITY = KCITY(ICT)                                                RMS00318
      CTOT67(ICITY,KIND) = CT                                           RMS00319
      DO 6003 I = 1,5                                                   RMS00320
      EOLD(ICITY,KIND,I) = X(I)                                         RMS00321
      IF (GAMA(KIND,I).NE.0.0) GO TO 6103                               RMS00322
      POLD(ICITY,KIND,I) = 0.0                                          RMS00323
      GO TO 6003                                                        RMS00324
 6103 IF (X(I)*Y(I).NE.0.0) GO TO 6104                                  RMS00325
      POLD(ICITY,KIND,I) = 0.0                                          RMS00326
      GO TO 6003                                                        RMS00327
 6104 POLD(ICITY,KIND,I) = Y(I)/X(I)                                    RMS00328
 6000 FORMAT(F10.0,10X,4F10.0,13X,I3,I2,/,4F10.0,F10.1,F10.0)           RMS00329
      PMED(KIND,I) = PMED(KIND,I)+POLD(ICITY,KIND,I)                    RMS00330
       KGOR(KIND,I) = KGOR(KIND,I)+1                                    RMS00331
 6003 CONTINUE                                                          RMS00332
      GO TO 5999                                                        RMS00333
 6006 CONTINUE                                                          RMS00334
      DO 2302 JNK = 1,19                                                RMS00335
      DO 2301 KGO = 1,5                                                 RMS00336
      IF(KGOR(JNK,KGO).EQ.0) GO TO 2301                                 RMS00337
      PMED(JNK,KGO) = PMED(JNK,KGO)/KGOR(JNK,KGO)                       RMS00338
 2301 CONTINUE                                                          RMS00339
 2302 CONTINUE                                                          RMS00340
      DO 2350 ICK = 1,91                                                RMS00341
      DO 2345 JNK = 1,19                                                RMS00342
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0256                KG = JKEEP(JNK)                                                          RMS00343
0257                DO 2340 KNK = 1,5                                                        RMS00344
0258                KGO = LKEEP(KG,KNK)                                                      RMS00345
0259                IF (KGO)  2345,2345,2310                                                 RMS00346
0260          2310 IF (POLD(ICK,JNK,KGO)) 2320,2315,2320                                     RMS00347
0261          2315 POLD(ICK,JNK,KGO) = PMED(JNK,KGO)                                         RMS00348
0262          2320 IF (EOLD(ICK,JNK,KGO)) 2340,2325,2340                                     RMS00349
0263          2325 EOLD(ICK,JNK,KGO) = .001                                                  RMS00350
0264          2340 CONTINUE                                                                  RMS00351
0265          2345 CONTINUE                                                                  RMS00352
0266          2350 CONTINUE                                                                  RMS00353
0267                PERUN(92) = .04                                                          RMS00354
0268                DO 201 I = 1,7                                                           RMS00355
0269                READ (LTAPE,202) K,IK                                                    RMS00356
0270                K = K - 20+(20/K)                                                        RMS00357
0271           201 JKEEP (K) = IK                                                            RMS00358
0272           202 FORMAT (2I3)                                                              RMS00359
0273                IF(LLLLL.EQ.1) GO TO  38                                                 RMS00360
0274                LLLLL = 1                                                                RMS00361
0275                DO 5991 ICT = 1,91                                                       RMS00362
0276                I = ICT                                                                  RMS00363
0277                PERUN(I) = .04                                                           RMS00364
0278                IF(IDYEAR.EQ.1967) GO TO 5991                                            RMS00365
0279                DO 5990 MJ=1,19                                                          RMS00366
0280          5990 EOLDH(ICT,MJ) = EOLD(ICT,MJ,5)                                            RMS00367
0281                EOLDH(ICT,20) = QTH(ICT)                                                 RMS00368
0282                READ(LTAPE,5992) (B(I,J), J = 1,19)                                      RMS00369
0283          5991 CONTINUE                                                                  RMS00370
0284                DO 298 I = 1,91                                                          RMS00371
0285                READ (LTAPE,299) RNET(I)                                                 RMS00372
0286           298 CONTINUE                                                                  RMS00373
0287                DO 401 I = 1,8                                                           RMS00374
0288                READ(LTAPE,405)(LABEL(I,J), J = 1,20)                                    RMS00375
0289           401 CONTINUE                                                                  RMS00376
0290           299 FORMAT(20X,F10.3)                                                         RMS00377
0291            38 CONTINUE                                                                  RMS00378
0292                LPNT1 = 0                                                                RMS00379
          C                                                                                  RMS00380
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             C       GROWTH FACTOR CALCULATIONS FOR 1970-1980 ONLY                           RMS00381
             C                                                                               RMS00382
 0293              IF(IDYEAR.EQ.1967) GO TO 400                                              RMS00383
 0294         7009 READ(LREAD,1070) INY,(IYEAR(JRK),JRK=1,INY)                               RMS00384
 0295              WRITE(LWRIT,1070) INY,(IYEAR(JRK),JRK=1,INY)                              RMS00385
 0296              IMII = IYEAR(INY) - 1968 - I10C5                                          RMS00386
 0297         1070 FORMAT(I4,1X,12I5)                                                        RMS00387
 0298              IF (INY.EQ.0) STOP                                                        RMS00388
 0299              DO 1020 JRK = 1,54                                                        RMS00389
 0300              READ (LTAPE,7010) (GRFAC(JRK,KRK,1),KRK=1,20)                             RMS00390
 0301         7010 FORMAT (14F5.0,/,6F5.0)                                                   RMS00391
 0302         7015 FORMAT(14F5.3,/,6F5.3)                                                    RMS00392
 0303         1020 CONTINUE                                                                  RMS00393
 0304              DO 1025 JRK = 1,54                                                        RMS00394
 0305              DO 1025 KRK = 1,20                                                        RMS00395
 0306              GRFAC(JRK,KRK,1) = GRFAC(JRK,KRK,1)/100.                                  RMS00396
 0307         1025 CONTINUE                                                                  RMS00397
 0308              DO 1030 JRK = 1,54                                                        RMS00398
 0309              READ(LTAPE,7015) (GRFAC(JRK,KRK,2),KRK=1,20)                              RMS00399
 0310         1030 CONTINUE                                                                  RMS00400
 0311              DO 1040 JRK = 1,54                                                        RMS00401
 0312              READ(LTAPE,7015) (GRFAC(JRK ,KRK,3),KRK=1,20)                             RMS00402
 0313         1040 CONTINUE                                                                  RMS00403
 0314              DO 1060 JRK = 1,54                                                        RMS00404
 0315              READ(LTAPE,1050)(XINC(JRK,KRK),KRK=1,3)                                   RMS00405
 0316         1050 FORMAT(10X,F10.0,/,10X,F10.0,/,10X,F10.0)                                 RMS00406
 0317         1060 CONTINUE                                                                  RMS00407
             C                                                                               RMS00408
 0318              DO 7534 J=1,91                                                            RMS00409
 0319              READ(LREAD,7533) (FUDGE(J,I) , I=1,4)                                     RMS00410
 0320              IF(ISBUG.NE.1) GO TO 7534                                                 RMS00411
 0321              WRITE(LWRIT,7533) (FUDGE(J,I) , I=1,4)                                    RMS00412
 0322         7534 CONTINUE                                                                  RMS00413
 0323         7533 FORMAT(4F10.2)                                                            RMS00414
             C                                                                               RMS00415
             C                                                                               RMS00416
             C                                                                               RMS00417
             C        FOR AQCRS NOT INCLUDED IN OBE REPORT (CODE GREATER THAN 54 )           RMS00418
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            C                                                                              RMS00419
            C                                                                              RMS00420
            C                                                                              RMS00421
            C                                                                              RMS00422
            C                                                                              RMS00423
 0324             READ(LTAPE,1051) YGROW                                                   RMS00424
 0325         1051 FORMAT(30X,F10.2,40X)                                                   RMS00425
 0326         1310 FORMAT(1H ,I3,12F9.1,I5)                                                RMS00426
            C                                                                              RMS00427
            C                                                                              RMS00428
 0327             DO 1054 JRK = 1,20                                                       RMS00429
 0328             DO 1054 KRK = 1,3                                                        RMS00430
 0329             DO 1053 KC = 55,100                                                      RMS00431
 0330             LCITY = KCITY(KC)                                                        RMS00432
 0331             IF(LCITY.EQ.0) GO TO 1052                                                RMS00433
 0332             GRFAC(LCITY,JRK,KRK) = GRFAC(32,JRK,KRK)                                 RMS00434
 0333             GO TO 1053                                                               RMS00435
 0334         1052 GRFAC(LCITY,JRK,KRK) = 0.0                                              RMS00436
 0335         1053 CONTINUE                                                                RMS00437
 0336         1054 CONTINUE                                                                RMS00438
            C                                                                              RMS00439
 0337             DO 1055 IJ=1,38                                                          RMS00440
 0338             WRITE(LWRIT,1070) IJ                                                     RMS00441
 0339         1055 YGROW(IJ) = YGROW(IJ)/100.                                              RMS00442
 0340             READ(LREAD,1080) INC,(ICHO(JRK),JRK=1,INC)                               RMS00443
            C                                                                              RMS00444
 0341             IF(IA312.EQ.0) GO TO 7213                                                RMS00445
 0342             READ(LREAD,7211) BENGOV,BENEF,THIS1,P                                    RMS00446
 0343         7211 FORMAT(4F10.2)                                                          RMS00447
            C                                                                              RMS00448
            C   ***   OVERWRITES FEEDBACK MATRIX IF BENEFIT NOT EQ. $10 BILLION          **RMS00449
            C                                                                              RMS00450
 0344             IF(BENGOV.EQ.10000.) GO TO 7213                                          RMS00451
 0345             DO 7225 ICT = 1,91                                                       RMS00452
 0346             READ(LREAD,5992)(B(ICT,J),J=1,19)                                        RMS00453
 0347             WRITE(LWRIT,5992)(B(ICT,J),J=1,19)                                       RMS00454
 0348         7225 CONTINUE                                                                RMS00455
            C                                                                              RMS00456
 0349           7213 CONTINUE
               C                                                                                RMS00457
               C                                                                                RMS00458
               C                                                                                RMS00459
               C        ELIMINATES REQUESTS FOR INFO. ABOUT CITIES FOR WHICH NO DATA IS         RMS00460
               C        AVAILABLE (EXAMPLE - NO DATA FOR CITY NO. 13)                           RMS00461
               C                                                                                RMS00462
 0350                NIL = INC                                                                  RMS00463
 0351                DO 1063 I=1,INC                                                            RMS00464
 0352           1064 KIT = ICHO(I)                                                              RMS00465
 0353                IAB = KCITY(KIT)                                                           RMS00466
 0354                IF(IAB) 1063,1061,1063                                                     RMS00467
 0355           1061 NIL = NIL - 1                                                              RMS00468
 0356                DO 1062 NIPP = I,NIL                                                       RMS00469
 0357                ICHO(NIPP) = ICHO(NIPP + 1)                                                RMS00470
 0358           1062 CONTINUE                                                                   RMS00471
 0359                WRITE(LWRIT,1065) KIT                                                      RMS00472
 0360                GO TO 1064                                                                 RMS00473
 0361           1063 CONTINUE                                                                   RMS00474
 0362                INC = NIL                                                                  RMS00475
 0363           1065 FORMAT(/'  NO DATA AVAILABLE FOR CITY NO. ',I2)                            RMS00476
               C                                                                                RMS00477
               C                                                                                RMS00478
 0364           1080 FORMAT(16I5)                                                               RMS00479
 0365                DO 1100 JG = 1,INY                                                         RMS00480
 0366           1100 IYEAR(JG) = IYEAR(JG)-1969                                                 RMS00481
 0367           1110 JYKNT = 0                                                                  RMS00482
               C                                                                                RMS00483
               C                                                                                RMS00484
 0368           1355 CONTINUE                                                                   RMS00485
 0369                IF(JYKNT.EQ.0) GO TO 1115                                                  RMS00486
 0370                U(92) = PERUN(92)                                                          RMS00487
 0371                UN(92) = -XNN(92)/XL(92)                                                   RMS00488
 0372                CALL PRIN1 (92)                                                            RMS00489
 0373                I = 92                                                                     RMS00490
               C                                                                                RMS00491
 0374                PERPIN(I) = (1. + (PIN(I)/PI(I,20))) * PERPIN(I)                           RMS00492
 0375                PERXIN(I) = (1. + (XIN(I)/XI(I,20))) * PERXIN(I)                           RMS00493
                                                                                                RMS00494
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0376              PERXKN(I) = (1. + (XKN(I) / XK(I,20))) * PERXKN(I)                       RMS00495
0377              PERXDN(I) = (1. + (XDN(I)/XX(I,20))) * PERXDN(I)                         RMS00496
0378              PERYYN(I) = (1. + (YYN(I)/YY(I))) * PERYYN(I)                            RMS00497
0379              PERGN(I) = (1. + (GN(I)/G(I))) *  PERGN(I)                               RMS00498
0380              PERTN(I) = (1.+ (TN(I) / T(I))) * PERTN(I)                               RMS00499
0381              PERCN(I) = (1. + (CN(I)/ C(I))) * PERCN(I)                               RMS00500
0382              PERDNB(I) = (1. + (DNBARN(I) / XNBAR(I))) * PERDNB(I)                    RMS00501
0383              PERQBR(I) = (1. + (QBARN(I) / QBAR(I))) * PERQBR(I)                      RMS00502
0384              PERQCN(I) = (1. + (QCN(I) / QC(I))) * PERQCN(I)                          RMS00503
0385              PERQMN(I) = (1. + (QMN(I) / QM(I))) * PERQMN(I)                          RMS00504
0386              PERSUM(I) = (1. + (SUMNN(I) / SUMN(I,20))) * PERSUM(I)                   RMS00505
            C                                                                              RMS00506
            C                                                                              RMS00507
            C                                                                              RMS00508
            C                                                                              RMS00509
0387              DO 6106 I=1,1656                                                         RMS00510
0388         6106 ZERO(I) = 0.0                                                            RMS00511
0389         1115 CONTINUE                                                                 RMS00512
0390              IF (JYKNT.EQ.INY)  GO TO 7009                                            RMS00513
0391              JYKNT = JYKNT + 1                                                        RMS00514
0392              JYEAR = IYEAR(JYKNT)                                                     RMS00515
0393              IEX = JYEAR + 3                                                          RMS00516
            C                                                                              RMS00517
            C   *** TO GENERATE OCS SET TEST TO 8 - 1977 - NOW 1978   ***                  RMS00518
            C                                                                              RMS00519
0394              IF(JYEAR.EQ.IMII) GO TO 95                                               RMS00520
            C                                                                              RMS00521
0395              KYY = JYEAR+1969                                                         RMS00522
0396              XX(92,20) = 0.0                                                          RMS00523
0397              PI(92,20) = 0.0                                                          RMS00524
0398              XI(92,20) = 0.0                                                          RMS00525
0399              XK(92,20) = 0.0                                                          RMS00526
0400              SUMN(92,20) = 0.0                                                        RMS00527
0401              XNBAR(92) = 0.0                                                          RMS00528
0402              YY(92) = 0.0                                                             RMS00529
0403              XNT(92) = 0.0                                                            RMS00530
0404              C(92) = 0.0                                                              RMS00531
0405              XL(92) = 0.0                                                             RMS00532
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0406              QT(92) = 0.0                                                       RMS00533
0407              QM(92) = 0.0                                                       RMS00534
0408              QBAR(92) = 0.0                                                     RMS00535
0409              QC(92) = 0.0                                                       RMS00536
0410              G(92) = 0.0                                                        RMS00537
0411              T(92) = 0.0                                                        RMS00538
0412              GO TO (1120,1130,1130,1130,1130,1130,1140,1140,1140,1140,1140),    RMS00539
                 1    JYEAR                                                          RMS00540
0413         1120 KJNDX = 0                                                          RMS00541
0414              LJNDX = 0                                                          RMS00542
0415              GO TO 1150                                                         RMS00543
0416         1130 KJNDX = JYEAR-1                                                    RMS00544
0417              LJNDX = 0                                                          RMS00545
0418              GO TO 1150                                                         RMS00546
0419         1140 KJNDX = 5                                                          RMS00547
0420              LJNDX = JYEAR-6                                                    RMS00548
0421         1150 DO 1210 MPCITY= 1,INC                                              RMS00549
0422              KIT = ICHO(MPCITY)                                                 RMS00550
0423              LCITY = KCITY(KIT)                                                 RMS00551
0424              DO 1200 JGE = 1,20                                                 RMS00552
0425              IF(XXH(LCITY,JGE).EQ.0.0)  GO TO 1200                              RMS00553
0426              IF(GRFAC(LCITY,JGE,1).EQ.0.0) GO TO 1200                           RMS00554
0427              W(LCITY,JGE) = WBH(LCITY,JGE)/SUMNH(LCITY,JGE)                     RMS00555
0428         1160 GFAC1 = GRFAC(LCITY,JGE,1)                                         RMS00556
0429              GFAC2 = GRFAC(LCITY,JGE,2)                                         RMS00557
0430              GFACD = GFAC2 - GFAC1                                              RMS00558
0431              XX(LCITY,JGE) = XXH(LCITY,JGE)*(GFAC1+KJNDX/5.*GFACD +             RMS00559
                 1 (LJNDX/5.*(GRFAC(LCITY,JGE,3)- GFAC2)))                           RMS00560
0432              VFAC = XX(LCITY,JGE)/XXH(LCITY,JGE)                                RMS00561
0433              DO 1161 JS = 1,IEX                                                 RMS00562
0434         1161 W(LCITY,JGE) = W(LCITY,JGE) * 1.018                                RMS00563
0435              WB(LCITY,JGE) = WBH(LCITY,JGE)*VFAC                                RMS00564
0436              IF(SUMNH(LCITY,JGE).EQ.0.0.OR.W(LCITY,JGE).EQ.0.0)                 RMS00565
                 1 WRITE(LWRIT,1770) KIT,JGE                                         RMS00566
0437         1770 FORMAT(1H1,4I5)                                                    RMS00567
0438              SUMN(LCITY,JGE) = WB(LCITY,JGE) / W(LCITY,JGE)                     RMS00568
0439              PI(LCITY,JGE) = XX(LCITY,JGE)-WB(LCITY,JGE)                        RMS00569
0440              XI(LCITY,JGE) = XIH(LCITY,JGE)*VFAC                                RMS00570
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 0441              XK(LCITY,JGE) = XX(LCITY,JGE)/VK(JGE)
 0442              EOLD(LCITY,JGE,5) = EOLDH(LCITY,JGE) * VFAC                          RMS00571
 0443         1200 CONTINUE                                                             RMS00572
 0444              IF(LCITY.GT.53) GO TO 1204                                           RMS00573
 0445              IF(XINC(LCITY,1).NE.0.0) GO TO 1205                                  RMS00574
          C        YY(LCITY) = 0.0                                                      RMS00575
          C        GO TO 1210                                                           RMS00576
 0446              RATE = 0.0                                                           RMS00577
 0447              IF(KIT.EQ.23) RATE = .0762                                           RMS00578
 0448              IF(KIT.EQ.32) RATE = .0758                                           RMS00579
 0449              IF(KIT.EQ.33) RATE = .0645                                           RMS00580
 0450              YY(LCITY) = YYH(LCITY)                                               RMS00581
 0451              DO 1203 JS=1,IEX                                                     RMS00582
 0452         1203 YY(LCITY) = YY(LCITY) * (1.0 + RATE)                                 RMS00583
 0453              GO TO 1207                                                           RMS00584
 0454         1204 YY(LCITY) = YYH(LCITY)                                               RMS00585
 0455              DO 1206 LLJ = 1,IEX                                                  RMS00586
 0456         1206 YY(LCITY) = (YGROW(LCITY-53) + 1.0) * YY(LCITY)                      RMS00587
 0457              GO TO 1207                                                           RMS00588
 0458         1205 CONTINUE                                                             RMS00589
 0459              YY(LCITY) = XINC(LCITY,1)+KJNDX/5*(XINC(LCITY,2)-XINC(LCITY,1))+     RMS00590
                  1 LJNDX/5*(XINC(LCITY,3)-XINC(LCITY,2))                               RMS00591
 0460              YY(LCITY) = YY(LCITY) *1.144                                         RMS00592
 0461         1207 YFAC = YY(LCITY) /YYH(LCITY)                                         RMS00593
 0462              XNBAR(LCITY) = XNBAH(LCITY)*(YY(LCITY)-XX(LCITY,20))/                RMS00594
                  1  (YYH(LCITY)-XXH(LCITY,20))                                         RMS00595
 0463              T(LCITY) = TH(LCITY)*YFAC                                            RMS00596
 0464              G(LCITY) = GH(LCITY)*T(LCITY)/TH(LCITY)                              RMS00597
 0465              C(LCITY) = CH(LCITY)*YFAC                                            RMS00598
 0466              XNT(LCITY) = XNBAR(LCITY)+SUMN(LCITY,20)                             RMS00599
 0467              U(LCITY) = .04                                                       RMS00600
 0468              XL(LCITY) = XNT(LCITY)/(1.-U(LCITY))                                 RMS00601
 0469              QM(LCITY) = QMH(LCITY)*VFAC                                          RMS00602
 0470              QBAR(LCITY) = QBARH(LCITY)*(YY(LCITY)-XX(LCITY,20))/                 RMS00603
                  1   (YYH(LCITY)-XXH(LCITY,20))                                        RMS00604
 0471              QC(LCITY) = QCH(LCITY)*C(LCITY)/CH(LCITY)                            RMS00605
 0472              QT(LCITY) = QC(LCITY)+QBAR(LCITY)+QM(LCITY)                          RMS00606
 0473         1210 CONTINUE                                                             RMS00607
                                                                                        RMS00603
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0474          1212 FORMAT(F10.3,60X,I5,I3)                                                  RMS00609
0475               GO TO (1220,1230,1235,1235,1235,1235,1235,1240,1240,1240,1240,    RMS00610
                  1  1240),JYEAR                                                        RMS00611
0476          1220 DO 1227 MPCITY= 1,INC                                                RMS00612
0477               KIT = ICHO(MPCITY)                                                   RMS00613
0478               WRITE(6,1070) KIT                                                    RMS00614
0479               LCITY = KCITY(KIT)                                                   RMS00615
0480               DO 1225 JGE = 1,20                                                   RMS00616
0481               IF(XXH(LCITY,JGE).EQ.0.0)  GO TO 1225                                RMS00617
0482               XXT(LCITY,JGE) = XXH(LCITY,JGE)+2./3.*(XX(LCITY,JGE)-XXH(LCITY,    RMS00618
                  1  JGE))                                                              RMS00619
0483          1225 CONTINUE                                                             RMS00620
0484          1227 CONTINUE                                                             RMS00621
0485               GO TO 1260                                                           RMS00622
0486          1230 KJNDX = 0                                                            RMS00623
0487               LJNDX = 0                                                            RMS00624
0488               GO TO 1250                                                           RMS00625
0489          1235 KJNDX = JYEAR-2                                                      RMS00626
0490               LJNDX = 0                                                            RMS00627
0491               GO TO 1250                                                           RMS00628
0492          1240 KJNDX = 5                                                            RMS00629
0493               LJNDX = JYEAR-7                                                      RMS00630
0494          1250 DO 1257 MPCITY= 1,INC                                                RMS00631
0495               KIT = ICHO(MPCITY)                                                   RMS00632
0496               LCITY = KCITY(KIT)                                                   RMS00633
0497               DO 1255 JGE = 1,20                                                   RMS00634
0498               IF (XXH(LCITY,JGE).EQ.0.0)  GO TO 1255                               RMS00635
0499               XXT(LCITY,JGE) = XXH(LCITY,JGE)*(GRFAC(LCITY,JGE,1)+                RMS00636
                  1(KJNDX/5*(GRFAC(LCITY,JGE,2)-GRFAC(LCITY,JGE,1)))                    RMS00637
                  1 +(LJNDX/5*(GRFAC(LCITY,JGE,3)-GRFAC(LCITY,JGE,2))))                 RMS00638
0500          1255 CONTINUE                                                             RMS00639
0501          1257 CONTINUE                                                             RMS00640
0502          1260 DO 1262 MPCITY= 1,       INC                                         RMS00641
0503               KIT = ICHO(MPCITY)                                                   RMS00642
0504               LCITY = KCITY(KIT)                                                   RMS00643
0505               DO 1261 JGE = 1,20                                                   RMS00644
0506               IF (XXH(LCITY,JGE).EQ.0.0) GO TO 1261                                RMS00645
0507               XKT(LCITY,JGE) = XXT(LCITY,JGE)/VK(JGE)                              RMS00646
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0508          1261 CONTINUE                                                          RMS00647
0509          1262 CONTINUE                                                          RMS00648
             C                                                                       RMS00649
             C                                                                       RMS00650
             C******                                                                 RMS00651
             C      REMOVE AFTER THIS RUN                                            RMS00652
             C                                                                       RMS00653
0510                WRITE(6,6594)                                                    RMS00654
0511                WRITE(6,6595) PERRC                                              RMS00655
0512                WRITE(6,6594)                                                    RMS00656
0513                WRITE(6,6596) XX                                                 RMS00657
0514          6594 FORMAT(1H1)                                                       RMS00658
0515          6595 FORMAT(1H ,20F5.2)                                                RMS00659
0516          6596 FORMAT(1H ,10F10.2)                                               RMS00660
             C**********                                                             RMS00661
             C                                                                       RMS00662
             C                                                                       RMS00663
0517          6354 FORMAT(1H ,I5)                                                    RMS00664
0518                DO 6355 MI = 1,INC                                               RMS00665
0519                IK = ICHO(MI)                                                    RMS00666
0520                I = KCITY(IK)                                                    RMS00667
0521                PI(I,20) = PI(I,20) * PERPIN(I)                                  RMS00668
0522                XI(I,20) = XI(I,20) * PERXIN(I)                                  RMS00669
0523                XK(I,20) = XK(I,20) * PERXKN(I)                                  RMS00670
0524                XX(I,20) = XX(I,20) * PERXDN(I)                                  RMS00671
0525                C(I) = C(I) * PERCN(I)                                           RMS00672
0526                YY(I) = YY(I) * PERYYN(I)                                        RMS00673
0527                SUMN(I,20) = SUMN(I,20) * PERSUM(I)                              RMS00674
0528                XNBAR(I) = XNBAR(I) * PERDNB(I)                                  RMS00675
0529                XNT(I) = SUMN(I,20) + XNBAR(I)                                   RMS00676
0530                U(I) = PERUN(I)                                                  RMS00677
0531                G(I) = G(I) * PERGN(I)                                           RMS00678
0532                T(I) = T(I) * PERTN(I)                                           RMS00679
0533                QC(I) = QC(I) * PERQCN(I)                                        RMS00680
0534                QM(I) = QM(I) * PERQMN(I)                                        RMS00681
0535                QBAR(I) = QBAR(I) * PERQBR(I)                                    RMS00682
0536                XL(I) = XNT(I) / (1. - PERUN(I))                                 RMS00683
0537                QT(I) = QC(I) + QM(I) + QBAR(I)                                  RMS00684
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 0538         6355 CONTINUE                                                          RMS00685
             C                                                                      RMS00686
             C                                                                      RMS00687
             C                                                                      RMS00688
             C        DATA TABLES 1970-1780                                         RMS00689
             C                                                                      RMS00690
 0539               IF(ISBUG2.EQ.0) GO TO 400                                       RMS00691
 0540               DO 1350 JRKK = 1,INC                                            RMS00692
 0541               JJRK = ICHO(JRKK)                                               RMS00693
 0542               JRK = KCITY(JJRK)                                               RMS00694
 0543               WRITE(LWRIT,1315)                                               RMS00695
 0544               WRITE(LWRIT,1311) (IAQCR(JRK,KRK).KRK=1,20),KYY                 RMS00696
 0545         1311 FORMAT(1H ,I4,19A4,'YEAR = ',I4,'= NOW (T)',/)                   RMS00697
 0546               WRITE(LWRIT,1312)                                               RMS00698
 0547         1312 FORMAT(1H ,'IND  VA 1967    VA NOW VA (T-1)   EMP(M) EMP -NOW   INRMS00699
                  1V-67  INV NOW  WB 1967  WB NOW    PI NOW     Q-67    Q-NOW  AQCR')RMS00700
 0548         1315 FORMAT (1H1)                                                     RMS00701
 0549               DO 1340 KRK = 1,20                                              RMS00702
 0550               IF (XXH(JRK,KRK).EQ.0.0)  GO TO 1340                            RMS00703
 0551               WRITE(LWRIT,1310) KRK,XXH(JRK,KRK),XX(JRK,KRK),XXT(JRK,KRK),    RMS00704
                  1 SUMNH(JRK,KRK),SUMN(JRK,KRK),XIH(JRK,KRK),XI(JRK,KRK),          RMS00705
                  2WBH(JRK ,KRK),WB(JRK,KRK),PI(JRK,KRK),                           RMS00706
                  3  EOLDH(JRK,KRK)  ,EOLD(JRK,KRK,5),JRK                           RMS00707
 0552         1320 FORMAT(1H ,10F10.1,2X,I3)                                        RMS00708
 0553         1340 CONTINUE                                                         RMS00709
 0554               IF(YYH(JRK).EQ.0.0) GO TO 1350                                  RMS00710
 0555               WRITE(LWRIT,1323)                                               RMS00711
 0556         1323 FORMAT(1H ,/)                                                    RMS00712
 0557               WRITE(LWRIT,1321)                                               RMS00713
 0558         1321 FORMAT(1H ,'  INC 1967  INC NOW  EMP(C)-67 EMP(C)NOW  REV 1967  RERMS00714
                  1V NOV   EXP 1967  EXP NQW  CONSMP-67 CONSMP NOW  AQCR')          RMS00715
 0559               WRITE(LWRIT,1320) YYH(JRK),YY(JRK),XNBAH(JRK),XNBAR(JRK),       RMS00716
                  1 TH(JRK),T(JRK),GH(JRK),G(JRK),CH(JRK),C(JRK),JRK                RMS00717
 0560               WRITE(LWRIT,1323)                                               RMS00718
 0561               WRITE(LWRIT,1322)                                               RMS00719
 0562         1322 FORMAT(1H ,' EMP(T)-67 EMP(T)NOW  LABOR-67 LABOR NOW  QM 1967    QRMS00720
                  1M NOW   QC 1967    QC NOW  QBAR 1967  QBAR NOW   AQCR')          RMS00721
 0563               WRITE(LWRIT,1320) XNTH(JRK),XNT(JRK),XLH(JRK),XL(JRK),QMH(JRK),  RMS00722
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                 1QM(JRK),QCH(JRK),QC(JRK),QBARH(JRK),QBAR(JRK),JRK                     RMS00723
0564         1350 CONTINUE                                                              RMS00724
           C                                                                            RMS00725
           C        MAKE OPTIONAL - ONLY DATA TABLES GIVEN                              RMS00726
           C        IF ISBUG2= 1 AS IT IS HERE                                          RMS00727
           C                                                                            RMS00728
           C      GO TO 1355                                                            RMS00729
0565          400 CONTINUE                                                              RMS00730
           C                                                                            RMS00731
           C                                                                            RMS00732
           C                                                                            RMS00733
           C***********************************************************************RMS00734
           C                                                                            RMS00735
           C        GENERAL PARAMETER CARD                                              RMS00736
           C                                                                            RMS00737
           C        ISBUG2=1 DATA TABLES FOR 1970'S REQUESTED                           RMS00738
           C        ICTAB = 1 CONVERGENCE PROCESS FOR NEWTON RAPSON REQUESTED           RMS00739
           C            IGOV = 1 FOR GOVERNMENT ASSISTANCE                              RMS00740
           C                                                                            RMS00741
           C                                                                            RMS00742
0566              READ(LREAD,410) INPT(1),NOPE,(LPARA(I), I=1,NOPE),                    RMS00743
                 1 MCNT,INPT(2),NOPE1,LPNT1,(LPNT2(I), I=1,NOPE1),NUMCIT                RMS00744
                 2  ,IPRN1,IPRN2        ,IPRN3 ,ISBUG         ,ISBUG2                   RMS00745
                 3 ,ICTAB,IGOV                                                          RMS00746
           C                                                                            RMS00747
           C                                                                            RMS00748
           C***********************************************************************RMS00749
           C                                                                            RMS00750
0567              DO 7183 I= 1,2                                                        RMS00751
0568         7183 READ(LREAD,7184) (TITLE(J,I), J=1,20)                                 RMS00752
0569         7184 FORMAT(20A4)                                                          RMS00753
           C                                                                            RMS00754
           C                                                                            RMS00755
           C        READ IN FIXED DELTC FOR 312(A) REPORT                               RMS00756
           C                                                                            RMS00757
0570              IF(IA312.EQ.0) GO TO 7175                                             RMS00758
0571              READ(LREAD,7212) BEN                                                  RMS00759
0572         7212 FORMAT(8F5.0)                                                         RMS00760
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 0573            ADJUST = BENEF*(BEN(JYEAR-3)/BEN(8) )                          RMS00761
 0574            READ(LREAD,7174) QGIVEN                                        RMS00762
 0575       7174 FORMAT(7F10.4)                                                 RMS00763
 0576       7175 CONTINUE                                                       RMS00764
 0577            KPRN1 = IPRN1                                                  RMS00765
 0578            KPRN2 = IPRN2                                                  RMS00766
 0579            KPRN3 = IPRN3                                                  RMS00767
 0580            KSBUG = ISBUG                                                  RMS00768
 0581            IF(INPT(1)+INPT(2).EQ.0) STOP                                  RMS00769
 0582            NOPEN = NOPE + NOPE1                                           RMS00770
 0583            NUMCIT = NUMCIT + 1                                            RMS00771
 0584            IHELP = 0                                                      RMS00772
 0585        700 CONTINUE                                                       RMS00773
 0586            NUMCIT = NUMCIT - 1                                            RMS00774
 0587            NEWCIT = 1                                                     RMS00775
 0588            NBEFOR = 0                                                     RMS00776
 0589            NBEFO1 = 1                                                     RMS00777
 0590            NBEFO3 = 0                                                     RMS00778
 0591            NBEFO2 = 1                                                     RMS00779
 0592            IPRN1 = KPRN1                                                  RMS00780
 0593            IPRN2 = KPRN2                                                  RMS00781
 0594            IPRN3 = KPRN3                                                  RMS00782
 0595            ISBUG = KSBUG                                                  RMS00783
 0596            NOPE1 = NOPEN-NOPE                                             RMS00784
 0597            NOK = NOPE                                                     RMS00785
 0598            IHELL = 0                                                      RMS00786
 0599        705 IHELP = IHELP + 1                                              RMS00787
 0600            IF(IHELP.LT.3) GO TO 706                                       RMS00788
 0601            IHELP = 1                                                      RMS00789
 0602            IF (NOPEN.EQ.1)   GO TO 704                                    RMS00790
 0603            LSTRAT = 8                                                     RMS00791
 0604            IKSW = 1                                                       RMS00792
 0605            DO 7999 K = 1,MCNT                                             RMS00793
 0606            IK = MCITY(K)                                                  RMS00794
 0607            I = KCITY(IK)                                                  RMS00795
 0608            CALL PRIN1 (I)                                                 RMS00796
 0609            XX(92,20) = XX(92,20) + XX(I,20)                               RMS00797
 0610            PI(92,20) = PI(92,20) + PI(I,20)                               RMS00798
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0611            XI(92,20) = XI(92,20) + XI(I,20)                                RMS00799
0612            XK(92,20) = XK(92,20) + XK(I,20)                                RMS00800
0613            SUMN(92,20) = SUMN(92,20) + SUMN(I,20)                          RMS00801
0614            XNBAR(92) = XNBAR(92) + XNBAR(I)                                RMS00802
0615            YY(92) = YY(92) + YY(I)                                         RMS00803
0616            C(92) = C(92) + C(I)                                            RMS00804
0617            XNT(92) = XNT(92) + XNT(I)                                      RMS00805
0618            XL(92) = XL(92) + XL(I)                                         RMS00806
0619            QT(92) = QT(92) + QT(I)                                         RMS00807
0620            QM(92) = QM(92) + QM(I)                                         RMS00808
0621            QBAR(92) = QBAR(92) + QBAR(I)                                   RMS00809
0622            QC(92) = QC(92) + QC(I)                                         RMS00810
0623            G(92) = G(92) + G(I)                                            RMS00811
0624            T(92) = T(92) + T(I)                                            RMS00812
          C                                                                     RMS00813
0625            PERPIN(I) = (1. + (PIN(I)/PI(I,20))) * PERPIN(I)                RMS00814
0626            PERXIN(I) = (1. + (XIN(I)/XI(I,20))) * PERXIN(I)                RMS00815
0627            PERXKN(I) = (1. + (XKN(I) / XK(I,20))) * PERXKN(I)              RMS00816
0628            PERSUM(I) = (1. + (SUMNN(I) / SUMN(I,20))) * PERSUM(I)          RMS00817
0629            PERXDN(I) = (1. + (XDN(I)/XX(I,20))) * PERXDN(I)                RMS00818
0630            PERYYN(I) = (1. + (YYN(I)/YY(I))) * PERYYN(I)                   RMS00819
0631            PERGN(I) = (1. + (GN(I)/G(I))) *  PERGN(I)                      RMS00820
0632            PERTN(I) = (1.+ (TN(I) / T(I))) * PERTN(I)                      RMS00821
0633            PERCN(I) = (1. + (CN(I)/ C(I))) * PERCN(I)                      RMS00822
0634            PERDNB(I) = (1. + (DNBARN(I) / XNBAR(I))) * PERDNB(I)           RMS00823
0635            PERQBR(I) = (1. + (QBARN(I) / QBAR(I))) * PERQBR(I)             RMS00824
0636            PERQCN(I) = (1. + (QCN(I) / QC(I))) * PERQCN(I)                 RMS00825
0637            IF(QM(I)) 7988,7988,7987                                        RMS00826
0638       7987 CONTINUE                                                        RMS00827
0639            PERQMN(I) = (1. + (QMN(I) / QM(I))) * PERQMN(I)                 RMS00828
0640            GO TO 7999                                                      RMS00829
0641       7988 PERQMN(I) = 1.0                                                 RMS00830
          C                                                                     RMS00831
          C                                                                     RMS00832
0642       7999 CONTINUE                                                        RMS00833
0643            IKSW = 0.0                                                      RMS00834
0644        704 IF(NUMCIT.LT.1.AND.IDYEAR.NE.1967) GO TO 1355                   RMS00835
0645            IF(NUMCIT.EQ.0) GO TO 400                                       RMS00836
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 0646           706 INTT = INPT(IHELP)                                                          RMS00837
 0647               IF(INTT.EQ.0) GO TO 705                                                     RMS00838
 0648               GO TO (481,10),INTT                                                         RMS00839
               C                                                                                RMS00840
               C                                                                                RMS00841
               C                                                                                RMS00842
 0649          6001 FORMAT(I10,5F10.2)                                                          RMS00843
               C                                                                                RMS00844
               C                                                                                RMS00845
               C                                                                                RMS00846
               C                                                                                RMS00847
               C                                                                                RMS00848
               C         TWO DIGIT INDUSTRY INFORMATION .. TWO ALTERNATIVES...                  RMS00849
               C              (1) DETAILED SIC INFORMATION ONE SMSA AT A TIME (LPNT1 = 1RMS00850
               C              (2) ONE TWO DIGIT SIC ( AT A TIME ) FOR ALL CITIES (LPNT1=RMS00851
               C         WITHIN EITHER CATEGORY, THE ECONOMY CAN BE AFFECTED IN ONE OF TRMS00852
               C         DEPENDING ON THE DATA GIVEN.                                           RMS00853
               C              (1) COST FIGURES ARE GIVEN DIRECTLY (LPNT2=1)                     RMS00854
               C              (2) PRICE CHANGES FOR FUEL ARE GIVEN (LPNT2=2)                    RMS00855
               C         NOX= NO. OF CITIES FOR WHICH TWO DIGIT SIC COST DATA IS GIVEN          RMS00856
               C              (LPNT1=1)                                                         RMS00857
               C                                                                                RMS00858
               C                                                                                RMS00859
               C                                                                                RMS00860
               C                                                                                RMS00861
               C                                                                                RMS00862
 0650            10 CONTINUE                                                                    RMS00863
 0651           720 KOUNT = 0                                                                   RMS00864
 0652               IHELL = IHELL + 1                                                           RMS00865
 0653               LPNTT = LPNT2(IHELL)                                                        RMS00866
 0654               LSTRAT = LPNTT + 5                                                          RMS00867
               C                                                                                RMS00868
 0655            55 DO 70 I=1,91                                                                RMS00869
 0656               DNR(I) = 1.0                                                                RMS00870
 0657               PDN(I) = 0.0                                                                RMS00871
 0658               PPID(I) = 0.0                                                               RMS00872
 0659               PXID(I) = 0.0                                                               RMS00873
 0660               PXKD(I) = 0.0                                                               RMS00874
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0661            PXD(I) = 0.0                                                    RMS00875
0662           ED(I,5) = 0.0                                                    RMS00876
0663           PID(I) = 0.0                                                     RMS00877
0664           WBD(I) = 0.0                                                     RMS00878
0665           XID(I) = 0.0                                                     RMS00879
0666           XKD(I) = 0.0                                                     RMS00880
0667           PDN(I) = 0.0                                                     RMS00881
0668        70 XD(I) = 0.0                                                      RMS00882
      C                                                                         RMS00883
      C          IF LPNT1 = 1 ... COST DATA FOR EACH CITY IS PRECEEDED BY THE   RMS00884
      C          ACTUAL CITY CODE NUMBER AND THE NO. OF IND. IN THAT CITY FOR   RMS00885
      C          WHICH COST DATA IS GIVEN.                                      RMS00886
      C                                                                         RMS00887
      C          IF LPNT1 = 2 COST DATA FOR EACH IND. IS PRECEEDED BY THE SIC CORMS00888
      C          NUMBER AND THE NO. OF  CITIES FOR WHICH THAT IND. EXISTS AND HARMS00889
      C          COST DATA.                                                     RMS00890
      C                                                                         RMS00891
0669           MCNT = 1                                                         RMS00892
0670           II = 1                                                           RMS00893
0671           NOTE = 1                                                         RMS00894
0672           MAX = 0                                                          RMS00895
0673           IF (LPNTT .NE. 3) GO TO 54                                       RMS00896
      C                                                                         RMS00897
      C                                                                         RMS00898
      C         GENERAL FEEDBACK SEGMENT                                        RMS00899
      C         OPTION NUMBER EIGHT                                             RMS00900
      C                                                                         RMS00901
0674      5992 FORMAT(2(7F10.4,/),5F10.4,23X,I3)                                RMS00902
0675           KOUNT = KOUNT + 1                                                RMS00903
0676           NOI = 0                                                          RMS00904
0677           IFEED = 1                                                        RMS00905
0678           IK = MCITY(1)                                                    RMS00906
      C        IK = MMCITY(KOUNT)                                               RMS00907
0679           LCITY = KCITY(IK)                                                RMS00908
0680           DO 56 I = 1,19                                                   RMS00909
0681           IF(INDCI(LCITY,I) .EQ. 0) GO TO 56                               RMS00910
0682           NOI = NOI + 1                                                    RMS00911
0683           IND(NOI) = I                                                     RMS00912
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 0684           56 CONTINUE
 0685              IF(IGOV.EQ.1.AND.NOI.NE.0) GO TO 3659                                RMS00913
 0686              IF(NOI.EQ.0.OR.ADJUST.EQ.0) GO TO 43                                 RMS00914
 0687         3659 CONTINUE                                                             RMS00915
 0688              MIN = NOI                                                            RMS00916
 0689              MCITY(II) = IK                                                       RMS00917
 0690              DO 42 I = 1,MIN                                                      RMS00918
 0691              INDI = IND(I)                                                        RMS00919
 0692              IUN = INDI                                                           RMS00920
 0693              PXD(IUN) = B(LCITY,INDI) * ADJUST        / THIS1                     RMS00921
 0694              ED(IUN,5) = AB(IUN)*PXD(IUN)                                         RMS00922
 0695              PPID(IUN) = (1.- BETA(INDI))*PXD(IUN)                                RMS00923
 0696              PXID(IUN) = PICOEF(INDI)*PPID(IUN)                                   RMS00924
 0697           42 PXKD(IUN) = PXID(IUN)/(1. + D(INDI))                                 RMS00925
 0698              GO TO 17                                                             RMS00926
 0699           43 IFFED = 0                                                            RMS00927
 0700              IF(IPRN3.EQ.0) GO TO 5003                                            RMS00928
 0701              WRITE (LWRIT,930)                                                    RMS00929
 0702          930 FORMAT (//,1H ,'INTERREGIONAL FEEDBACK EFFECT NOT AVAILABLE FOR THRMS00930
                  1IS AQCR')                                                            RMS00931
 0703              GO TO 5003                                                           RMS00932
             C                                                                          RMS00933
             C       312(A) COST DATA - INPUT FOR DETAILED SIC                          RMS00934
             C                                                                          RMS00935
 0704           54 IF(IA312.EQ.1) GO TO 7151                                            RMS00936
 0705              READ(LREAD, 410) JCITY,NOI                                           RMS00937
 0706              GO TO 7153                                                           RMS00938
 0707         7151 NOI = 6                                                              RMS00939
 0708              MIN = NOI                                                            RMS00940
 0709              READ(LREAD,7152) HHI,JCITY                                           RMS00941
 0710              LCITY = KCITY(JCITY)                                                 RMS00942
 0711              MCITY(II) = JCITY                                                    RMS00943
 0712              READ(LREAD,7152) HHA,JCITY                                           RMS00944
 0713              DELTC(LCITY) = 0.0                                                   RMS00945
 0714         7152 FORMAT(7F10.4,3X,I3)                                                 RMS00946
 0715              GO TO 725                                                            RMS00947
 0716         7153 CONTINUE                                                             RMS00948
             C                                                                          RMS00949
                                                                                        RMS00950
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0717            LCITY = KCITY(JCITY)
0718            IND1 = NOI -20 + (20/NOI)                                   RMS00951
0719            IF(LPNT1.EQ.2) GO TO 1                                      RMS00952
0720            MCITY(II) = JCITY                                           RMS00953
0721            MIN = NOI                                                   RMS00954
0722            GO TO 2                                                     RMS00955
0723          1 MCNT = JCITY                                                RMS00956
0724            MIN = JCITY                                                 RMS00957
0725            MAX = JKEEP(IND1)                                           RMS00958
          C                                                                 RMS00959
0726          2 ITT = 5                                                     RMS00960
0727            IF(LPNTT.NE.1) GO TO 725                                    RMS00961
0728            ITT = 1                                                     RMS00962
0729            READ(LREAD,730) DELTC(LCITY)                                RMS00963
0730            DELTC(LCITY) = DELTC(LCITY) / QT(LCITY)                     RMS00964
0731        730 FORMAT(10X,F10.2)                                           RMS00965
0732        725 CONTINUE                                                    RMS00966
          C                                                                 RMS00967
0733            IH = 0                                                      RMS00968
0734            J = 0                                                       RMS00969
0735            DO 556 JJ=1,MIN                                             RMS00970
0736            IF(IA312.EQ.1) GO TO 7154                                   RMS00971
0737            READ (LREAD,6001)  IK                                       RMS00972
0738            HOLD(1) = 0.0                                               RMS00973
0739            HOLD(2) = 0.0                                               RMS00974
0740            HOLD(3) = 0.0                                               RMS00975
0741            HOLD(4) = 0.0                                               RMS00976
0742            HOLD(5) = 0.0                                               RMS00977
0743            HOLD(4) = .2*POLD(LCITY,IK,4)                               RMS00978
          C     READ(LREAD,6001) IK,(HOLD(IS), IS=1,ITT)                    RMS00979
0744            IF(LPNT1.EQ.1) GO TO 3                                      RMS00980
0745            IUN = KCITY(IK)                                             RMS00981
0746            LCITY = IUN                                                 RMS00982
0747            MCITY(J) = IK                                               RMS00983
0748            GO TO 40                                                    RMS00984
0749          3 IND1 = IK - 20 +(20/IK)                                     RMS00985
0750            NEXT = JKEEP(IND1)                                          RMS00986
0751            IF (MAX.LT.NEXT) MAX = NEXT                                 RMS00987
                                                                            RMS00988
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0752              IUN = IND1
0753              IND(J) = IND1                                                          RMS00989
0754           40 GO TO (41,4), LPNTT                                                    RMS00990
            C                                                                            RMS00991
0755         7154 IK = ISPIN(JJ)                                                         RMS00992
0756              IND1 = IK - 20 + (20/IK)                                               RMS00993
0757              HOLD(1) = HHA(JJ)                                                      RMS00994
0758              HOLD(2) = HHI(JJ)                                                      RMS00995
0759              IUN = IND1                                                             RMS00996
0760              IF(INDCI(LCITY,IND1).EQ.0) GO TO 7155                                  RMS00997
0761              J = J + 1                                                              RMS00998
0762              IND(J) = IND1                                                          RMS00999
0763              GO TO 41                                                               RMS01000
0764         7155 IH = IH + 1                                                            RMS01001
0765              GO TO 556                                                              RMS01002
            C                                                                            RMS01003
            C        LPNT2 = 1 ... COST FIGURES GIVEN DIRECTLY                           RMS01004
            C                                                                            RMS01005
0766           41 CONTINUE                                                               RMS01006
            C     P = 1.                                                                 RMS01007
0767              IF(IGOV.EQ.0) GO TO 3641                                               RMS01008
0768              HERE = HOLD(1)                                                         RMS01009
0769              HAHA = HOLD(2)                                                         RMS01010
0770              HOLD(1) = P * HERE                                                     RMS01011
0771              HOLD(2) = P * HAHA                                                     RMS01012
0772         3641 CONTINUE                                                               RMS01013
0773              PPID(IUN) = -HOLD(1) - DELTC(LCITY) * EOLD(LCITY,IND1,5) * P           RMS01014
0774              PXID(IUN) = PICOEF(IND1)*PPID(IUN) - HOLD(2)                           RMS01015
0775              PXKD(IUN) = PXID(IUN)/(1.+D(IND1))                                     RMS01016
0776              K = LCITY                                                              RMS01017
0777              PXD(IUN) =-XX(LCITY,IND1)+XX(LCITY,IND1)*(PXKD(IUN)+XK(K,IND1))        RMS01018
                1 /XK(LCITY,IND1)                                                        RMS01019
0778              ED(IUN,5) = AB(IUN)*PXD(IUN)                                           RMS01020
0779              GO TO 556                                                              RMS01021
0780            4 DO 5 K=1,5                                                             RMS01022
0781              IF(POLD(LCITY,IND1,K).EQ.0.)HOLD(K) =0.0                               RMS01023
0782            5 PNEWD(IUN,K) = POLD(LCITY,IND1,K) + HOLD(K)                            RMS01024
0783          556 CONTINUE                                                               RMS01025
                                                                                         RMS01026
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0784            MIN = MIN - IH
0785            IF(MIN.EQ.0.AND.IA312.EQ.1) GO TO 5555                                RMS01027
0786            IF(LPNT1.EQ.1) NOI = MIN                                              RMS01028
0787            IF(LPNT1.EQ.2) JCITY = MIN                                            RMS01029
0788            IF(LPNTT .EQ. 1) GO TO 17                                             RMS01030
          C                                                                           RMS01031
          C       LPNT2 = 2 ... CHANGE IN FUEL PRICES GIVEN                           RMS01032
          C                                                                           RMS01033
          C       FOURTH RECURSIVE BLOCK - FUEL DATA                                  RMS01034
          C       TWO DIGIT SIC - 12 EQUATIONS                                        RMS01035
          C       ENDOGENOUS VARIABLES ARE...                                         RMS01036
          C            EOLD - QUATITY OF EACH TYPE OF FUEL USED BY A GIVEN IND.       RMS01037
          C            CTOT67 - TOTAL COST OF FUEL 1967                               RMS01038
          C            XX - VALUE ADDED 1967                                          RMS01039
          C            ZZ - TOTAL QUATITY OF FUEL CONSUMED                            RMS01040
          C            XI,XK, AND PI                                                  RMS01041
          C       EXOGENOUS VARIABLES...                                              RMS01042
          C            POLD - PRICE OF FUEL 1967                                      RMS01043
          C            PNEW - PROJECTED PRICE OF FUEL FOR 1967                        RMS01044
          C                   WITH POLUTION COSTS                                     RMS01045
          C            GAMA - FUEL EXPONENTS - CONSTANTS FOR 1967                     RMS01046
          C            XKT - 1963                                                     RMS01047
          C            A - THE COEF. OF THE FUEL FUNCTION                             RMS01048
          C            ALIT - THE COEF. FROM THE FUNCTION Z=A*V                       RMS01049
          C            D,BETA,PICOEF, AND XX/XK                                       RMS01050
          C                                                                           RMS01051
          C                                                                           RMS01052
0789            ICHECK = 0                                                            RMS01053
0790            MKEEP = MAX + 2                                                       RMS01054
0791            DO 27 I=1,MKEEP                                                       RMS01055
0792         27 KEEP(I) = LKEEP(MAX,I)                                                RMS01056
0793          6 MM=0                                                                  RMS01057
0794            KPIST = 18                                                            RMS01058
0795            M = 0                                                                 RMS01059
0796            DO 12 I=1,MIN                                                         RMS01060
0797            IF(LPNT1.EQ.2) GO TO 7                                                RMS01061
0798            IND1 = IND(I)                                                         RMS01062
0799            IUN = IND1                                                            RMS01063
                                                                                      RMS01064
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         GO TO 8                                                       RMS01065
       7 IK = MCITY(I)                                                 RMS01066
         LCITY = KCITY(IK)                                             RMS01067
         IUN = LCITY                                                   RMS01068
       8 DO 9 K=1,MKEEP                                                RMS01069
         KK = KEEP(K)                                                  RMS01070
         X(MM+K) = POLD(LCITY,IND1,KK)                                 RMS01071
         IF(ICHECK.EQ.1) X(MM+K) = PNEWD(IUN,KK)                       RMS01072
       9 X(MM+K+MKEEP) = GAMA(IND1,KK)                                 RMS01073
         MM = MM+2*(MKEEP-5)                                           RMS01074
         X(MM+11) = XKT(LCITY,IND1)                                    RMS01075
         X(MM+12) = D(IND1)                                            RMS01076
         X(MM+13) = 1.- BETA(IND1)                                     RMS01077
         X(MM+14) = PICOEF(IND1)                                       RMS01078
         X(MM+15) = A(IND1)                                            RMS01079
         X(MM+16) = ALIT(IND1)                                         RMS01080
         X(MM+17) = XX(LCITY,IND1)/XK(LCITY,IND1)                      RMS01081
         X(MM+18) = PICON(IND1)                                        RMS01082
         DO 11 K=1,MKEEP                                               RMS01083
         KK = KEEP(K)                                                  RMS01084
      11 Y(M+K) = EOLD(LCITY,IND1,KK)                                  RMS01085
         M = M + MKEEP - 5                                             RMS01086
         Y(M+6) = XK(LCITY,IND1)                                       RMS01087
         Y(M+7) = CTOT67(LCITY,IND1)                                   RMS01088
         Y(M+8) = XX(LCITY,IND1)                                       RMS01089
         Y(M+9) = ZZ(LCITY,IND1)                                       RMS01090
         Y(M+10)= PI(LCITY,IND1)                                       RMS01091
         Y(M+11) = XI(LCITY,IND1)                                      RMS01092
         M = M + 11                                                    RMS01093
      12 MM = MM + 18                                                  RMS01094
C                                                                      RMS01095
         MARK = 4                                                      RMS01096
         LVAR = 11 + (MKEEP-5)                                         RMS01097
         MCASES = MIN*LVAR                                             RMS01098
         CALL SIMUL                                                    RMS01099
         IF(ICHECK.EQ.1) GO TO 17                                      RMS01100
         ICHECK = 1                                                    RMS01101
         M = 0                                                         RMS01102
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            DO 16 I=1,MIN                                                   RMS01103
            IF(LPNT1.EQ.2) GO TO 13                                         RMS01104
            IND1 = IND(I)                                                   RMS01105
            IUN = IND1                                                      RMS01106
            GO TO 14                                                        RMS01107
         13 IK = MCITY(I)                                                   RMS01108
            LCITY = KCITY(IK)                                               RMS01109
            IUN = LCITY                                                     RMS01110
         14 DO 15 K=1,MKEEP                                                 RMS01111
         15 ED(IUN,K) = Y(M+K)                                              RMS01112
            M = M + MKEEP - 5                                               RMS01113
            PXKD(IUN) = Y(M+6)                                              RMS01114
            CTOTD7(IUN) = Y(M+7)                                            RMS01115
            PXD(IUN) = Y(M+8)                                               RMS01116
            PZD(IUN) = Y(M+9)                                               RMS01117
            PPID(IUN) = Y(M+10)                                             RMS01118
            PXID(IUN) = Y(M+11)                                             RMS01119
         16 M = M + 11                                                      RMS01120
            GO TO 6                                                         RMS01121
      C                                                                     RMS01122
         17 CONTINUE                                                        RMS01123
            M = 0                                                           RMS01124
            DO 22 IT = 1,MIN                                                RMS01125
            IF(LPNT1.EQ.2) GO TO 18                                         RMS01126
            IND1 = IND(IT)                                                  RMS01127
            IUN = IND1                                                      RMS01128
            GO TO 19                                                        RMS01129
         18 IK = MCITY(IT)                                                  RMS01130
            LCITY = KCITY(IK)                                               RMS01131
            IUN = LCITY                                                     RMS01132
         19 IF(LPNTT.EQ.1.OR.LPNTT.EQ.3) GO TO 21                           RMS01133
            DO 23 K=1,MKEEP                                                 RMS01134
         23 ED(IUN,K) = ED(IUN,K) -Y(M+K)                                   RMS01135
            M = M + MKEEP - 5                                               RMS01136
            PXKD(IUN) = PXKD(IUN) - Y(M+6)                                  RMS01137
            CTOTD7(IUN) = CTOTD7(IUN) - Y(M+7)                              RMS01138
            PXD(IUN) = PXD(IUN) - Y(M+8)                                    RMS01139
            PZD(IUN) = PZD(IUN) - Y(M+9)                                    RMS01140
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0874              PPID(IUN) = PPID(IUN) - Y(M+10)                                           RMS01141
0875              PXID(IUN) = PXID(IUN) - X(M+11)                                           RMS01142
0876              M = M + 11                                                                RMS01143
0877           21 I = LCITY                                                                 RMS01144
0878              IF(W(I,IND1)*SUMN(I,20).EQ.0.0) GO TO 39                                  RMS01145
0879              PDN(IUN) = BETA(IND1)*PXD(IUN)/W(I,IND1)                                  RMS01146
0880              DNR(I) = DNR(I)      -(PDN(IUN)/SUMN(I,20))                               RMS01147
0881           39 CONTINUE                                                                  RMS01148
0882           37 FORMAT(1H ,2I3,F12.1,F12.4)                                               RMS01149
0883              PID(I) = PID(I) + PPID(IUN)                                               RMS01150
0884              XID(I) = XID(I) + PXID(IUN)                                               RMS01151
0885              XKD(I) = XKD(I) + PXKD(IUN)                                               RMS01152
0886              XD(I) = XD(I) + PXD(IUN)                                                  RMS01153
0887              XD1(I) = XD(I)                                                            RMS01154
0888              WBD(I) = WBD(I) + BETA(IND1)*PXD(IUN)                                     RMS01155
0889              D2(I) = WBD(I)                                                            RMS01156
0890           22 CONTINUE                                                                  RMS01157
0891              NOTE = 1                                                                  RMS01158
0892              GO TO 5555                                                                RMS01159
            C                                                                               RMS01160
            C                                                                               RMS01161
            C                                                                               RMS01162
            C                                                                               RMS01163
            C                                                                               RMS01164
            C      INPT(2) = 1                                                              RMS01165
            C                                                                               RMS01166
            C                                                                               RMS01167
            C       ALL CITY INFO. FOR ALL IND. REQUESTED                                   RMS01168
            C                                                                               RMS01169
0893          481 CONTINUE                                                                  RMS01170
0894              NOTE = NOPE                                                               RMS01171
            C                                                                               RMS01172
            C     NOTE>>>ABOVE READ INDICATES THE TYPE OF CONTROL COST DATA GIVEN           RMS01173
            C      (1) NOPE> TYPES OF POLLUTION IMPACT TO BE EXAMINED FOR EACH CITY RMS01174
            C                         = 2>>INCOME CHANGE GIVEN                              RMS01175
            C                         = 4**ELECTRIC COST INCREASE GIVEN - PROFIT AFFECRMS01176
            C                         = 5**ELECTRIC COST INCREASE GIVE - INCOME AFFECTRMS01177
            C                         = 3>>TAX CHANGE GIVEN                                 RMS01178
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          C       (3) NUMBER OF CITIES FOR WHICH DATA IS GIVEN -- MCNT                 RMS01179
          C                                                                            RMS01180
 0895             IF (NOPE-5)  102,102,482                                             RMS01181
 0896         482 WRITE(LWRIT,483)  NOPE,(LPARA(I), I=1,NOPE)                          RMS01182
 0897         483 FORMAT(1H1,'BAD CONTROL COST PARAMETER CARD',4I4)                    RMS01183
 0898             STOP                                                                 RMS01184
 0899         102 DO 103 I=1,NOPE                                                      RMS01185
 0900             IF(LPARA(I).GT.5.OR.LPARA(I).LT.1) GO TO 482                         RMS01186
 0901             IF(I.EQ. NOPE) GO TO 103                                             RMS01187
 0902             IF (LPARA(I+1) .EQ. LPARA(I)) GO TO 482                              RMS01188
 0903         103 CONTINUE                                                             RMS01189
          C                                                                            RMS01190
          C ***** MAKE EASILY ADJUSTABLE READ                                          RMS01191
          C                                                                            RMS01192
          C 104 READ(LREAD,105) MCITY(I),(COST(J,I),J=1,5)                             RMS01193
          C                                                                            RMS01194
 0904             IKSW = 0                                                             RMS01195
          C                                                                            RMS01196
          C        ZERO LOOP REMOVED FROM HERE                                         RMS01197
          C                                                                            RMS01198
 0905             IF(IDYEAR.EQ.1967) GO TO 9909                                        RMS01199
 0906             IF(IA312.EQ.1) GO TO 7100                                            RMS01200
          C                                                                            RMS01201
          C                                                                            RMS01202
          C        COST INPUT FOR 1970-1980 SIMULATION                                 RMS01203
          C                                                                            RMS01204
          C                                                                            RMS01205
 0907             DO 104 I=1,MCNT                                                      RMS01206
 0908             SCIN = 0.0                                                           RMS01207
 0909             SRIN = 0.0                                                           RMS01208
 0910             SC = 0.0                                                             RMS01209
 0911             SR = 0.0                                                             RMS01210
 0912         109 READ(LREAD,105) RIN,R,CIN,CC,MCITY(I)                                RMS01211
 0913             RISUM = RIN + R + CIN + CC                                           RMS01212
 0914             IF(RISUM.EQ.0) GO TO 110                                             RMS01213
 0915             GO TO 111                                                            RMS01214
 0916         110 NUMCIT = NUMCIT - 1                                                  RMS01215
 0917             NEWCIT = 1                                                           RMS01216
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0918             IF(NUMCIT.LT.1) GO TO 1355                                                    RMS01217
0919             GO TO 109                                                                     RMS01218
0920         111 CONTINUE                                                                      RMS01219
0921             KI = MCITY(I)                                                                 RMS01220
0922             L = KCITY(KI)                                                                 RMS01221
0923             IF(L.EQ.0) GO TO 104                                                          RMS01222
           C                                                                                   RMS01223
           C      USED FOR COST STRAT NO. 3 ONLY                                               RMS01224
           C                                                                                   RMS01225
           C     COST(4,I) = COST(4,I) *.5                                                     RMS01226
           C     COST(3,I) = 30.                                                               RMS01227
0924             COST(1,I) = CC-(R*.6)                                                         RMS01228
0925             COFI(I) = CIN-(RIN*.6)                                                        RMS01229
0926             COST(4,I) = R*.6+RIN*.6                                                       RMS01230
0927             COST(3,I) = 0.0                                                               RMS01231
0928             DELTC(I) = COST(4,I)/QT(L)                                                    RMS01232
           C                                                                                   RMS01233
           C      USED ONLY FOR COST STRAT. NO. 2 AND 3                                        RMS01234
           C                                                                                   RMS01235
0929             COST(1,I) = COST(1,I)-(623.7*COST(1,I)/808.067 )                              RMS01236
           C                                                                                   RMS01237
           C      USED FOR COST STRAT NO. 3 ONLY                                               RMS01238
           C                                                                                   RMS01239
           C     COST(1,I) = COST(1,I) *.5                                                     RMS01240
           C                                                                                   RMS01241
           C      USED ONLY FOR COST STRAT. NO. 2 AND 3                                        RMS01242
           C                                                                                   RMS01243
0930             COFI(I) = COFI(I)-(623.7*COFI(I)/808.067  )                                   RMS01244
           C                                                                                   RMS01245
           C      USED FOR COST STRAT NO. 3 ONLY                                               RMS01246
           C                                                                                   RMS01247
           C     COFI(I) = COFI(I) *.5                                                         RMS01248
0931         105 FORMAT(20X,2F10.1/20X,2F10.1,33X,I3,4X)                                       RMS01249
0932         104 CONTINUE                                                                      RMS01250
0933             GO TO 5555                                                                    RMS01251
           C                                                                                   RMS01252
           C      INPUT FOR 312(A) REPORT                                                      RMS01253
           C                                                                                   RMS01254
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 0934           7100 DO 7104 I=1,MCNT
 0935                READ(LREAD,7101) CIN,SIN,R,MCITY(I)                                            RMS01255
 0936           7101 FORMAT(3F10.5,43X,I3)                                                          RMS01256
 0937           7111 CONTINUE                                                                       RMS01257
 0938                KI = MCITY(I)                                                                  RMS01258
 0939                L = KCITY(KI)                                                                  RMS01259
 0940                IF(L.EQ.0) GO TO 7104                                                          RMS01260
 0941                COST(1,I) = SIN*(1.+AAA)*.4 +R                                                 RMS01261
 0942                DELTC(I) = .60*((CIN*(1.+AIA))+(SIN*(1.+AAA)))/QT(L)                           RMS01262
 0943                COFI(I) = CIN*(1.+AIA)*.40                                                     RMS01263
 0944                IF(IGOV.EQ.0) GO TO 7104                                                       RMS01264
 0945                HERE = COST(1,I)                                                               RMS01265
 0946                HAHA = COFI(I)                                                                 RMS01266
            C                                                                                       RMS01267
            C                                                                                       RMS01268
            C*****************************************************************RMS01269
            C                                                                                       RMS01270
 0947                DELTC(I) =  P  * DELTC(I)                                                      RMS01271
 0948                COST(1,I) =  P  * HERE                                                         RMS01272
 0949                COFI(I) =  P  * HAHA                                                           RMS01273
            C                                                                                       RMS01274
            C                                                                                       RMS01275
            C*********************************************@@@@@@@@@@************RMS01276
            C                                                                                       RMS01277
 0950           7104 CONTINUE                                                                       RMS01278
 0951                GO TO 5555                                                                     RMS01279
            C                                                                                       RMS01280
            C                                                                                       RMS01281
            C         COST INPUT FOR 1967 RUNS                                                      RMS01282
            C                                                                                       RMS01283
            C                                                                                       RMS01284
 0952           9909 CONTINUE                                                                       RMS01285
 0953                DO 9104 I=1,MCNT                                                               RMS01286
 0954                SCIN = 0.0                                                                     RMS01287
 0955                SRIN = 0.0                                                                     RMS01288
 0956                SC = 0.0                                                                       RMS01289
 0957                SR = 0.0                                                                       RMS01290
 0958                DO 9109 J=1,5                                                                  RMS01291
 0959                READ(LREAD,9105) RIN,R,CIN,CC,MCITY(I)                                         RMS01292
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0960               SRIN = SRIN + (RIN/5)*.6                                   RMS01293
0961               SCIN = SCIN + CIN/5                                        RMS01294
0962               SC = SC + CC/5                                             RMS01295
0963          9109 SR = SR + (R/5)*.6                                         RMS01296
0964               KI = MCITY(I)                                              RMS01297
0965               L = KCITY(KI)                                              RMS01298
0966               IF(L.EQ.0) GO TO 9104                                      RMS01299
0967               COST(1,I) = SC - SR                                        RMS01300
0968               COFI(I) = SCIN - SRIN                                      RMS01301
0969               COST(4,I) = SR + SRIN                                      RMS01302
0970               DELTC(I) = COST(4,I)/QT(L)                                 RMS01303
0971          9104 CONTINUE                                                   RMS01304
0972          9105 FORMAT(20X,2F10.1/20X,2F10.1,33X,I3,4X)                    RMS01305
              C                                                               RMS01306
              C                                                               RMS01307
              C                                                               RMS01308
0973          5555 CONTINUE                                                   RMS01309
0974               DO 5000 III = 1,NOTE                                       RMS01310
0975               II = 1                                                     RMS01311
0976               IF(INTT.EQ.2.AND.MIN.EQ.0.AND.IA312.EQ.1) GO TO 1000       RMS01312
0977               IF(INTT.EQ.2) GO TO 100                                    RMS01313
0978               LSTRAT = LPARA(III)                                        RMS01314
0979               II = LSTRAT                                                RMS01315
0980               GO TO (1000,2000,3000,1000,2000),LSTRAT                    RMS01316
              C                                                               RMS01317
              C       ALL CITY INFORMATION  ALL IND......EFFECT OF DIRECT REDUCTION  RMS01318
              C       OF INDUSTRY'S PROFITS BY AIR PLOUTION CONTROL EQUIPMENT COSTS  RMS01319
              C                                                               RMS01320
              C              PID = CHANGE IN PROFIT                           RMS01321
              C              XID = CHANGE IN INVESTMENT                       RMS01322
              C              XKD = CHANGE IN CAP. STOCK                       RMS01323
              C              XD = CHANGE IN VALUE ADDED                       RMS01324
              C              WBD = CHANGE IN WAGE BILL                        RMS01325
              C                                                               RMS01326
              C                                                               RMS01327
0981          1000 DO 1001 K=1,MCNT                                           RMS01328
0982               KI = MCITY(K)                                              RMS01329
0983               I = KCITY(KI)                                              RMS01330
```

```
0984          IF (I.EQ.0) GO TO 1001                                            RMS01331
0985          DNR(I) = 1.0                                                      RMS01332
0986          IF(INTT.EQ.2.AND.MIN.EQ.0.AND.IA312.EQ.1) GO TO 7192              RMS01333
0987          IF (LSTRAT-4) 310,300,300                                         RMS01334
0988      300 COST(II,K) = DELTC(K) * QM(I)                                     RMS01335
0989          COFI(K) = 0.0                                                     RMS01336
0990          GO TO 310                                                         RMS01337
0991     7192 COST(II,K) = HHA(7)                                               RMS01338
0992          COFI(K) = HHI(7)                                                  RMS01339
0993          LSTRAT = 1                                                        RMS01340
0994          IF(IGOV.EQ.0) GO TO 310                                           RMS01341
        C                                                                       RMS01342
        C***********************************************************************RMS01343
        C                                                                       RMS01344
0995          COST(II,K)  =  P*  COST(II,K)                                     RMS01345
0996          COFI(K) =  P  * COFI(K)                                           RMS01346
        C***********************************************************************RMS01347
        C                                                                       RMS01348
0997      310 PID(I) =-COST(II,K)                                               RMS01349
0998          XID(I) = PICOEF(20)*PID(I) -COFI(K)                               RMS01350
0999          XKD (I) = XID(I) /(1.+D(20))                                      RMS01351
1000          XD(I) = -XX(I,20) + XX(I,20) * ((XKD(I)+XK(I,20)) / XK(I,20))     RMS01352
1001          XD1(I) = XD(I)                                                    RMS01353
1002          WBD(I) =  BETA(20)*XD(I)                                          RMS01354
1003          D2(I) = WBD(I)                                                    RMS01355
1004     1001 CONTINUE                                                          RMS01356
        C                                                                       RMS01357
        C                                                                       RMS01358
        C                                                                       RMS01359
        C         FIRST SIMULTANEOUS SYSTEM (Y,G,T, AND C)                      RMS01360
        C                                                                       RMS01361
        C         WHERE THE ENDOGENOUS VAR. ARE...                              RMS01362
        C               YY - TOT. REGIONAL INCOME                               RMS01363
        C               T - GOVERNMENT REVENUE                                  RMS01364
        C               C - CONSUMPTION (1967)                                  RMS01365
        C         THE EXOGENOUS VAR. ARE ...                                    RMS01366
        C               XX - VALUE ADDED (ACTUAL VALUE AND + DELTA)             RMS01367
        C               G - GOV5RNMENT EXPENDITURE                              RMS01368
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             C                                                                         RMS01369
 1005          100 LCHECK = 0                                                          RMS01370
             C      LVAR = 4                                                           RMS01371
             C      MCASES = MCNT*4                                                    RMS01372
 1006               LVAR = 3                                                           RMS01373
 1007               MCASES = MCNT*LVAR                                                 RMS01374
 1008          120 MM = 0                                                              RMS01375
 1009               KPIST = 4                                                          RMS01376
 1010               M = 0                                                              RMS01377
 1011               DO 1002 K=1,MCNT                                                   RMS01378
 1012               KI = MCITY(K)                                                      RMS01379
 1013               I = KCITY(KI)                                                      RMS01380
 1014               IJCIT = I                                                          RMS01381
 1015               IF (I.EQ.0) GO TO 1002                                             RMS01382
 1016               Y(M+1) = YY(I)                                                     RMS01383
 1017               Y(M+2) = G(I)                                                      RMS01384
 1018               Y(M+3) = C(I)                                                      RMS01385
 1019               X(MM+1) = XX(I,20) + XD1(I)                                        RMS01386
 1020               X(MM+2) = T(I)                                                     RMS01387
 1021               X(MM+3) = FUDGE(I,1)                                               RMS01388
 1022               X(MM+4) = FUDGE(I,2)                                               RMS01389
 1023               M = M + 3                                                          RMS01390
 1024               MM = MM + 4                                                        RMS01391
 1025         1002 CONTINUE                                                            RMS01392
             C                                                                         RMS01393
 1026               MARK = 1                                                           RMS01394
             C                                                                         RMS01395
 1027               IF (ICTAB) 8015,8015,1014                                          RMS01396
 1028         1014 DO 951 IM=1,LVAR                                                    RMS01397
 1029          951 ARAB(IM) = SCCJ(IM)                                                 RMS01398
 1030         8015 CALL SIMUL                                                          RMS01399
             C                                                                         RMS01400
 1031         1015 M = 0                                                               RMS01401
 1032               IF(LCHECK)1003,1003,4000                                           RMS01402
 1033         1003 DO 1004 K=1,MCNT                                                    RMS01403
 1034               KI = MCITY(K)                                                      RMS01404
 1035               I = KCITY(KI)                                                      RMS01405
 1036               IF (I.EQ.0) GO TO 1004                                             RMS01406
 1037            YYD(I) = Y(M+1)
 1038            GD(I) = Y(M+2)                                             RMS01407
 1039            CD(I) = Y(M+3)                                             RMS01408
 1040            XD1(I) = 0.0                                               RMS01409
 1041            M = M + 3                                                  RMS01410
 1042       1004 CONTINUE                                                   RMS01411
 1043            LCHECK = 1                                                 RMS01412
 1044            NBEFOR = NBEFO1                                            RMS01413
 1045            GO TO 120                                                  RMS01414
 1046       4000 M = 0                                                      RMS01415
 1047            NEWCIT = 0                                                 RMS01416
 1048            NBEFO1 = 0                                                 RMS01417
 1049            DO 1007 K=1,MCNT                                           RMS01418
 1050            KI = MCITY(K)                                              RMS01419
 1051            I = KCITY(KI)                                              RMS01420
 1052            IF (I.EQ.0) GO TO 1007                                     RMS01421
 1053            YYD(I) = YYD(I) - Y(M+1)                                   RMS01422
 1054            GD(I) = GD(I) - Y(M+2)                                     RMS01423
 1055            CD(I) = CD(I) - Y(M+3)                                     RMS01424
 1056            M = M + LVAR                                               RMS01425
 1057            TD(I) = .100466*YYD(I)                                     RMS01426
 1058            QCD(I) = .04718 * CD(I)                                    RMS01427
 1059            QMD(I) = .19915 * XD(I)                                    RMS01428
 1060            QBARD(I) = .07947*(YYD(I)-XD(I))                           RMS01429
 1061            QTD(I) = QCD(I)+QMD(I)+QBARD(I)                            RMS01430
 1062            IF (LSTRAT-4) 320,330,330                                  RMS01431
 1063        320 DNBAR(I) = .103239*(YYD(I)-XD(I))                          RMS01432
 1064            DI(I) = DNBAR(I)                                           RMS01433
 1065            GO TO 1007                                                 RMS01434
 1066        330 DNBAR(I) = .103239 * (YYD(I)-XD(I) - DELTC(K) * QBARD(I))  RMS01435
 1067            DI(I) = DNBAR(I)                                           RMS01436
 1068       1007 CONTINUE                                                   RMS01437
           C                                                                RMS01438
 1069            DO 1012 K=1,MCNT                                           RMS01439
 1070            KI = MCITY(K)                                              RMS01440
 1071            I = KCITY(KI)                                              RMS01441
 1072            IF (I.EQ.0) GO TO 1012                                     RMS01442
 1073            SUMND(I) = D2(I)/W(I,20)                                   RMS01443
                                                                            RMS01444
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1074              XND(I) = DNR(I) * SUMND(I) + D1(I)                              RMS01445
1075              XLD(I) = 1.03924 * XND(I)                                       RMS01446
1076              XLL = XL(I) + XLD(I)                                            RMS01447
1077              UD(I) =-(XND(I)/XLL)                                            RMS01448
1078              D1(I) = 0.0                                                     RMS01449
1079              D2(I) = 0.0                                                     RMS01450
1080         1012 CONTINUE                                                        RMS01451
1081         7348 FORMAT(3F10.3,F10.4,33X,I3)                                     RMS01452
1082              IF(IPRN3)351,348,351                                            RMS01453
1083          351 CONTINUE                                                        RMS01454
1084              GO TO (343,344,344,343,343,344,344,344),LSTRAT                  RMS01455
1085          343 IF (IPRN1)  348,348,344                                         RMS01456
1086          344 DO 345 K = 1,MCNT                                               RMS01457
1087              KI = MCITY(K)                                                   RMS01458
1088              I = KCITY(KI)                                                   RMS01459
1089              CALL PRIN1 (I)                                                  RMS01460
1090          345 CONTINUE                                                        RMS01461
1091          348 IF (NOPEN.EQ.1) GO TO 5001                                      RMS01462
1092              ISTOP = 0                                                       RMS01463
1093         3348 CONTINUE                                                        RMS01464
1094              ISTOP = ISTOP + 1                                               RMS01465
1095              DO 1013 K = 1,MCNT                                              RMS01466
1096              KI = MCITY(K)                                                   RMS01467
1097              I = KCITY(KI)                                                   RMS01468
1098              IF(ISTOP.EQ.1) M = I                                            RMS01469
1099              IF(ISTOP.EQ.2) M = 92                                           RMS01470
1100              IF (I.EQ.0) GO TO 1013                                          RMS01471
1101              PIN(M) = PIN(M) + PID(I)                                        RMS01472
1102              XIN(M ) = XIN(M) + XID(I)                                       RMS01473
1103              XKN(M) = XKN(M) + XKD(I)                                        RMS01474
1104              XDN(M) = XDN(M) + XD(I)                                         RMS01475
1105              YYN(M) = YYN(M) + YYD(I)                                        RMS01476
1106              GN(M) = GN(M) + GD(I)                                           RMS01477
1107              TN(M) = TN(M) + TD(I)                                           RMS01478
1108              CN(M) = CN(M) + CD(I)                                           RMS01479
1109              DNBARN(M) = DNBARN(M) + DNBAR (I)                               RMS01480
1110              XNN(M) = XNN(M) + XND(I)                                        RMS01481
1111              XLN(M) = XLN(M) + XLD(I)                                        RMS01482
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 1112              UN(M) = UN(M) + UD(I)                                                 RMS01483
 1113              SUMNN(M) = SUMNN(M) + SUMND(I)                                        RMS01484
 1114              QBARN(M) = QBARN(M) + QBARD(I)                                        RMS01485
 1115              QTN(M) = QTN(M) + QTD(I)                                              RMS01486
 1116              QCN(M) = QCN(M) + QCD(I)                                              RMS01487
 1117              QMN(M) = QMN(M) + QMD(I)                                              RMS01488
 1118         1013 CONTINUE                                                              RMS01489
 1119              GO TO (3348,350) ,ISTOP                                               RMS01490
 1120          350 IF(IPRN3.EQ.0) GO TO 5001                                             RMS01491
 1121              IF (IPRN2)  5001,5001,346                                             RMS01492
 1122          346 IF (LSTRAT-5)  5001,347,5001                                          RMS01493
 1123          347 IKSW = 2                                                              RMS01494
 1124              DO 1347 K = 1,MCNT                                                    RMS01495
 1125              KI = MCITY(K)                                                         RMS01496
 1126              I = KCITY(KI)                                                         RMS01497
 1127              CALL PRINI(I)                                                         RMS01498
 1128         1347 CONTINUE                                                              RMS01499
 1129              IKSW = 0                                                              RMS01500
 1130              GO TO 5001                                                            RMS01501
            C                                                                            RMS01502
 1131         2000 CONTINUE                                                              RMS01503
            C                                                                            RMS01504
            C         CITY INFORMATION ( ALL-IND)                                        RMS01505
            C                   EFFECT                                                   RMS01506
            C         ON ECONOMY THROUGH CHANGE IN REGIONAL INCOME                       RMS01507
            C                                                                            RMS01508
 1132              DO 2001 K=1,MCNT                                                      RMS01509
 1133              KI = MCITY(K)                                                         RMS01510
 1134              I = KCITY(KI)                                                         RMS01511
 1135              IF (I.EQ.0) GO TO 2001                                                RMS01512
 1136              IF (LSTRAT-5) 2009,2008,2009                                          RMS01513
 1137         2008 COST(II,K) = -DELTC(K)*QC(I)                                          RMS01514
 1138              GO TO 377                                                             RMS01515
 1139         2009 COST(II,K) =-911.3 * ((YY(I) - XX(I,20)) / 366816.)*(BENEF/10000.)RMS01516
 1140          377 YR(I) = (YY(I)+COST(II,K))/YY(I)                                      RMS01517
 1141              TR(I) = 1.0                                                           RMS01518
 1142              DNR(I) = 1.0                                                          RMS01519
 1143         2001 CONTINUE                                                              RMS01520
 1144           GO TO 3002                                                  RMS01521
          C                                                                 RMS01522
          C        CITY INFORMATION - ALL IND                               RMS01523
          C                             EFFECT                              RMS01524
          C        ON ECONOMY THROUGH INCREASED TAXATION                    RMS01525
          C                                                                 RMS01526
 1145      3000 CONTINUE                                                    RMS01527
 1146           DO 3001 K=1,MCNT                                            RMS01528
 1147           KI = MCITY(K)                                               RMS01529
 1148           I = KCITY(KI)                                               RMS01530
 1149           IF (I.EQ.0) GO TO 3001                                      RMS01531
 1150           TR(I) = (T(I) - COST(II,K))/T(I)                            RMS01532
 1151           YR(I) = 1.0                                                 RMS01533
 1152           DNR(I) = 1.0                                                RMS01534
 1153      3001 CONTINUE                                                    RMS01535
          C                                                                 RMS01536
          C        THIRD SET OF SIMULTANEOUS EQUATIONS WHERE                RMS01537
          C              Y,G, AND C ARE ENDOGENOUS                          RMS01538
          C              T AND X ARE EXOGENOUS                              RMS01539
          C                                                                 RMS01540
 1154      3002 MARK = 3                                                    RMS01541
 1155           LVAR  = 3                                                   RMS01542
 1156           MCASES = MCNT * LVAR                                        RMS01543
 1157           LCHECK = 0                                                  RMS01544
 1158      2006 CONTINUE                                                    RMS01545
 1159           KPIST = 6                                                   RMS01546
 1160           MM = 0                                                      RMS01547
 1161           M = 0                                                       RMS01548
 1162           DO 2002 K=1,MCNT                                            RMS01549
 1163           KI = MCITY(K)                                               RMS01550
 1164           I = KCITY(KI)                                               RMS01551
 1165           IF (I.EQ.0) GO TO 2002                                      RMS01552
 1166           Y(M+1) = YY(I)                                              RMS01553
 1167           Y(M+2) = G(I)                                               RMS01554
 1168           Y(M + 3) = C(I)                                             RMS01555
 1169           X(MM+1) = TR(I)                                             RMS01556
 1170           X(MM+2) = YR(I)                                             RMS01557
 1171           X(MM+3)= XX(I,20)                                           RMS01558
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 1172                X(MM+4) = T(I)
 1173                X(MM+5) = FUDGE(I,1)                                                        RMS01559
 1174                X(MM+6) = FUDGE(I,2)                                                        RMS01560
 1175                M = M+3                                                                     RMS01561
 1176                MM = MM + 6                                                                 RMS01562
 1177           2002 CONTINUE                                                                    RMS01563
              C                                                                                  RMS01564
 1178                IF (ICTAB) 8019,8019,1018                                                   RMS01565
 1179           1018 DO 952 IM=1,LVAR                                                            RMS01566
 1180            952 ARAB(IM) = SCC1(IM)                                                         RMS01567
              C                                                                                  RMS01568
 1181           8019 CALL SIMUL                                                                  RMS01569
              C                                                                                  RMS01570
 1182           1019 M = 0                                                                       RMS01571
 1183                IF(LCHECK)2003,2003,2005                                                    RMS01572
 1184           2003 DO 2004 K=1,MCNT                                                            RMS01573
 1185                KI = MCITY(K)                                                               RMS01574
 1186                I = KCITY(KI)                                                               RMS01575
 1187                IF (I.EQ.0) GO TO 2004                                                      RMS01576
 1188                YYD(I) = Y(M+1)                                                             RMS01577
 1189                GD(I) = Y(M+2)                                                              RMS01578
 1190                CD(I) = Y(M+3)                                                              RMS01579
 1191                TR(I) = 1.0                                                                 RMS01580
 1192                YR(I) = 1.0                                                                 RMS01581
 1193                M = M+3                                                                     RMS01582
 1194           2004 CONTINUE                                                                    RMS01583
 1195                LCHECK = 1                                                                  RMS01584
 1196                NBEFOR = NBEF03                                                             RMS01585
 1197                GO TO 2006                                                                  RMS01586
              C                                                                                  RMSC1587
 1198           2005 M = 0                                                                       RMS01588
 1199                NEWCIT = 0                                                                  RMS01589
 1200                NBEF03 = 0                                                                  RMS01590
 1201                DO 2007 K=1,MCNT                                                            RMS01591
 1202                KI = MCITY(K)                                                               RMS01592
 1203                I = KCITY(KI)                                                               RMS01593
 1204                IF (I.EQ.0) GO TO 2007                                                      RMS01594
 1205                XD(I) = .34046*(YYD(I)-Y(M+1))                                              RMS01595
                                                                                                 RMS01596
 1206                M = M + 3                                                          RMS01597
 1207                WBD(I) = ALPHA(20) *XD(I)                                          RMS01598
 1208                PID(I) = XD(I) *(1.-BETA(20))                                      RMS01599
 1209                XID(I) = PICOEF(20) * PID(I)                                       RMS01600
 1210                XKD(I) = XID(I)/(1.+D(20))                                         RMS01601
 1211                D2(I) = WBD(I)                                                     RMS01602
 1212           2007 CONTINUE                                                           RMS01603
              C                                                                         RMS01604
 1213                GO TO 4000                                                         RMS01605
 1214           5001 IF (INTT.EQ.1) NOK = NOK - 1                                       RMS01606
 1215           5000 CONTINUE                                                           RMS01607
              C                                                                         RMS01608
              C                                                                         RMS01609
              C                                                                         RMS01610
 1216           5003 CONTINUE                                                           RMS01611
 1217                IF (NOK.EQ.0) IHELP = IHELP + 1                                    RMS01612
 1218                NOK = 1                                                            RMS01613
 1219                IF(INPT(2).EQ.2) NOPEI = NOPEI - 1                                 RMS01614
 1220                ID = NOPEI + INPT(1)                                               RMS01615
 1221                IF(ID.EQ.0) GO TO 700                                              RMS01616
 1222                INTT = INPT(2)                                                     RMS01617
 1223                GO TO 10                                                           RMS01618
 1224             95 I = 1000000                                                        RMS01619
 1225                IS = ICHO(I)                                                       RMS01620
 1226                STOP                                                               RMS01621
 1227           6004 FORMAT(1H1,' INDUSTRY-',I3,' DOES NOT EXIST FOR CITY-',I3)         RMS01622
 1228                END                                                                RMS01623
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FORTRAN IV G LEVEL  20                 PHELP                DATE = 72006            10/44/08               PAGE 0001
                                                                                    RMS01624
 0001             SUBROUTINE PHELP(XX,XD,PERX,XIP,XDEP)                            RMS01625
          C                                                                         RMS01626
          C                                                                         RMS01627
 0002             IF(XX) 10,10,8                                                    RMS01628
 0003           8 XDEP = XX / PERX                                                  RMS01629
 0004             XIP = ( XD/XX) * 100.                                             RMS01630
 0005             RETURN                                                            RMS01631
 0006          10 XDEP = 0.0                                                        RMS01632
 0007             XIP = 0.0                                                         RMS01633
 0008             RETURN                                                            RMS01634
 0009             END
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0001          SUBROUTINE PRINI (ICITY)                                                 RMS01635
        C                                                                              RMS01636
        C                                                                              RMS01637
        C                                                                              RMS01638
0002          DIMENSION  C(92),              CD(92),            CN(92)                 RMS01639
0003          DIMENSION  CTOTD7(91),         CTOT67(91,20),     DNBAR(92)              RMS01640
0004          DIMENSION  DNBARN(92),         EOLD(91,20,5),     ED(91,5)               RMS01641
0005          DIMENSION  G(92),              GD(92),            GN(92)                 RMS01642
0006          DIMENSION  IAGCR(92,20),       INDCI(92,20),      KCITY(100)             RMS01643
0007          DIMENSION  LABEL(10,20),       MCITY(91),         PDN(91)                RMS01644
0008          DIMENSION  PI(92,20),          PID(92),           PIN(92)                RMS01645
0009          DIMENSION  PPID(91),           PXD(91),           PXID(91)               RMS01646
0010          DIMENSION  PXKD(91),           QBAR(92),          QBARD(92)              RMS01647
0011          DIMENSION  QBARN(92),          QC(92),            QCD(92)                RMS01648
0012          DIMENSION  QCN(92),            QM(92),            QMD(92)                RMS01649
0013          DIMENSION  QMN(92),            QT(92),            QTD(92)                RMS01650
0014          DIMENSION  QTN(92),            SUMN(92,20),       SUMND(92)              RMS01651
0015          DIMENSION  SUMNN(92),          T(92),             TD(92)                 RMS01652
0016          DIMENSION  TN(92),             U(92),             UD(92)                 RMS01653
0017          DIMENSION  UN(92),             WN(92),            XD(92)                 RMS01654
0018          DIMENSION  XDN(92),            XI(92,20),         XID(92)                RMS01655
0019          DIMENSION  XIN(92),            XK(92,20),         XKD(92)                RMS01656
0020          DIMENSION INPT(2)                                                        RMS01657
0021          DIMENSION  XKN(92),            XL(92),            XLD(92)                RMS01658
0022          DIMENSION  XLN(92),            XNBAR(92),         XND(92)                RMS01659
0023          DIMENSION  XNN(92),            XNT(92),           XX(92,20)              RMS01660
0024          DIMENSION  YY(92),             YYD(92),           YYN(92)                RMS01661
0025          DIMENSION TITLE(20,2)                                                    RMS01662
0026          DIMENSION POLD(91,20,5),PNEWD(20,5)                                      RMS01663
        C                                                                              RMS01664
0027          DIMENSION    PERPIN(92),         PERTN(92),          PERSUM(92)          RMS01665
0028          DIMENSION    PERXIN(92),         PERCN(92),          PERQBR(92)          RMS01666
0029          DIMENSION    PERXKN(92),         PERDNB(92),         PERQTN(92)          RMS01667
0030          DIMENSION    PERXDN(92),         PERXNN(92),         PERQCN(92)          RMS01668
0031          DIMENSION    PERYYN(92),         PERXLN(92),         PERQMN(92)          RMS01669
0032          DIMENSION    PERGN(92),          PERUN(92)                               RMS01670
        C                                                                              RMS01671
        C                                                                              RMS01672
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 0033            COMMON /BLOXK1/   PERPIN,PERTN,PERSUM,PERXIN,PERCN,PERQBR,        RMS01673
                1                  PERXKN,PERDNB,PERQTN,PERXDN,PERXNN,PERQCN,      RMS01674
                2                  PERYYN,PERXLN,PERQMN,PERGN,PERUN                 RMS01675
          C                                                                         RMS01676
          C                                                                         RMS01677
 0034            COMMON / CPRIN / PXD, PXID, PXKD, PPID, CTOTD7, PDN, CTOT67       RMS01678
                1  ,EOLD,ED,POLD,PNEWD                                              RMS01679
 0035            COMMON/BUG/ISBUG,LREAD,LWRIT                                       RMS01680
 0036            COMMON /APRIN/PI,PID,XI,XID,XK,XKD,XX,XD,C,CD,YY,YYD,SUMN,SUMND,  RMS01681
                1              XNBAR,DNBAR,XNT,XND,U,UD,XL,XLD,G,GD,T,TD,QT        RMS01682
                2             ,QTD,QC,QCD,QM,QMD,QBAR,QBARD                         RMS01683
 0037            COMMON / ZEROT / PIN,XIN,XKN,XDN,YYN,GN,TN,CN,DNBARN,XNN,XLN,WN,  RMS01684
                1                UN,SUMNN,QBARN,QMN,QCN,QTN                         RMS01685
 0038            COMMON/NPRIN/ LABEL,MCITY,KCITY,       LSTRAT,INPT,IKSW,IHELP,IFEEDRMS01686
 0039            COMMON /PRITT/ TITLE,BENEF                                         RMS01687
 0040            COMMON / IPRIN /INTT,LPNTT   ,JYEAR,IAQCR,IJCIT,MIN,IA312          RMS01688
 0041            EQUIVALENCE (INDCI(1),XX(1))                                       RMS01689
 0042            I = ICITY                                                          RMS01690
 0043            WRITE(LWRIT,100)                                                   RMS01691
 0044            LPYEAR = 1969 + JYEAR                                              RMS01692
 0045            IF(ICITY.EQ.92) GO TO 760                                          RMS01693
 0046            IF(IKSW-1) 1,750,750                                               RMS01694
 0047          1 WRITE (LWRIT,110) LSTRAT,(LABEL(LSTRAT,J), J = 1,20)              RMS01695
 0048            WRITE(LWRIT,120) (IAQCR(I,J),J = 1,20) ,LPYEAR                     RMS01696
 0049            WRITE(LWRIT,130)                                                   RMS01697
 0050            WRITE(LWRIT,140)                                                   RMS01698
 0051            WRITE(LWRIT,150)                                                   RMS01699
 0052            WRITE(LWRIT,160)                                                   RMS01700
          C                                                                         RMS01701
 0053            CALL PHELP(PI(I,20),PID(I),PERPIN(I),PIP,PERRP)                    RMS01702
 0054            CALL PHELP(XI(I,20),XID(I),PERXIN(I),XIP,PERXI)                    RMS01703
 0055            CALL PHELP(XK(I,20),XKD(I),PERXKN(I),XKP,PERXK)                    RMS01704
 0056            CALL PHELP(XX(I,20),XD(I),PERXDN(I),XXP,PERX)                      RMS01705
 0057            CALL PHELP (C(I),CD(I),PERCN(I),CP,PERC)                           RMS01706
 0058            CALL PHELP(YY(I),YYD(I),PERYYN(I),YYP,PERYY)                       RMS01707
 0059            CALL PHELP(SUMN(I,20),SUMND(I),PERSUM(I),SUMNP,PERSN)              RMS01708
 0060            CALL PHELP(XNBAR(I),DNBAR(I),PERDNB(I),PNBAR,PERNB)                RMS01709
 0061            CALL PHELP(XNT(I),XND(I),PERXNN(I),XND,PERXN)                      RMS01710
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0062            CALL PHELP(XL(I),XLD(I),PERXLN(I),XLP,PERXL)                    RMS01711
0063            CALL PHELP(G(I),GD(I),PERCN(I),GP,PERG)                         RMS01712
0064            CALL PHELP(T(I),TD(I),PERTN(I),TP,PERT)                         RMS01713
0065            CALL PHELP(QC(I),QCD(I),PERQCN(I),QCP,PERQC)                    RMS01714
0066            CALL PHELP(QM(I),QMD(I),PERQMN(I),QMP,PERQM)                    RMS01715
0067            CALL PHELP(QBAR(I),QBARD(I),PERQBR(I),QBARP,PERQB)              RMS01716
0068            PERXN = PERSN + PERNB                                           RMS01717
0069            PERQT = PERQC + PERQM + PERQB                                   RMS01718
0070            PERXL = PERXN / .96                                             RMS01719
          C                                                                     RMS01720
          C                                                                     RMS01721
0071            IF(U(I)) 58,58,56                                               RMS01722
0072         56 UP = UD(I) / U(I)                                               RMS01723
0073            PERUX = 4.0                                                     RMS01724
0074            GO TO 59                                                        RMS01725
0075         58 PERUX = 4.0                                                     RMS01726
0076            UP = 0.0                                                        RMS01727
0077         59 CONTINUE                                                        RMS01728
0078            UX = U(I)*100.                                                  RMS01729
0079            UXD = UD(I)*100.                                                RMS01730
0080            WRITE(LWRIT,190) PERXX,XX(ICITY,20),XD(ICITY),XXP               RMS01731
0081            WRITE(LWRIT,170) PERP ,PI(ICITY,20),PID(ICITY),PIP              RMS01732
0082            WRITE(LWRIT,180) PERXI,XI(ICITY,20),XID(ICITY),XIP              RMS01733
0083            WRITE(LWRIT,200) PERXK,XK(ICITY,20),XKD(ICITY),XKP              RMS01734
0084            WRITE(LWRIT,210) PERSN,SUMN(ICITY,20),SUMND(ICITY),SUMNP        RMS01735
0085            WRITE(LWRIT,160)                                                RMS01736
0086            WRITE(LWRIT,240)                                                RMS01737
0087            WRITE(LWRIT,160)                                                RMS01738
0088            WRITE(LWRIT,260) PERNB,XNBAR(ICITY).DNBAR(ICITY),PNBAR          RMS01739
0089            WRITE(LWRIT,160)                                                RMS01740
0090            WRITE(LWRIT,300) PERYY,YY(ICITY),YYD(ICITY),YYP                 RMS01741
0091            WRITE(LWRIT,290) PERC,C(ICITY),CD(ICITY),CP                     RMS01742
0092            WRITE(LWRIT,310) PERXN,XNT(ICITY),XND(ICITY),XNP                RMS01743
0093            WRITE(LWRIT,320) PERUX,UX,UXD,UP                                RMS01744
0094            WRITE(LWRIT,330) PERXL,XL(ICITY),XLD(ICITY),XLP                 RMS01745
          C     WRITE(LWRIT,340) G(ICITY), GD(ICITY), GP                        RMS01746
0095            WRITE(LWRIT,350) PERT,T(ICITY),TD(ICITY),TP                     RMS01747
0096            WRITE (LWRIT,355)                                               RMS01748
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 0097             WRITE(LWRIT,360) PERQT,QT(ICITY),QTD(ICITY),QTP                        RMS01749
 0098             WRITE(LWRIT,220) PERQM,QM(ICITY),QMD(ICITY),QMP                        RMS01750
 0099             WRITE(LWRIT,270) PERQB,QBAR(ICITY),QBARD(ICITY),QBARP                  RMS01751
 0100             WRITE(LWRIT,370) PERQC,QC(ICITY),QCD(ICITY),QCP                        RMS01752
 0101         100 FORMAT(1H1)                                                            RMS01753
 0102         110 FORMAT(///1H ,'CONTROL STRATEGY NO. 'I1,' - ',20A4,/)                  RMS01754
                                                        $
***********01)  IEY004I COMMA**************************************************************************
 0103         120 FORMAT(1H ,'AQCR ',I3,1X,19A4,3X,'  FOR ',I4)                          RMS01755
 0104         130 FORMAT(1H ,74X,'WITHOUT',7X,' WITH',7X,'NET',8X,'PERCENT')             RMS01756
 0105         140 FORMAT(1H ,74X,'CONTROL',7X,'(T-1)',6X,'CHANGE',6X,'CHANGE')           RMS01757
 0106         150 FORMAT(1H ,4X,'MANUFACTURING INDUSTRIES')                              RMS01758
 0107         160 FORMAT(1H )                                                            RMS01759
 0108         170 FORMAT(1H ,6X,'PROFIT (MILLIONS)',48X,1X,3(F10.3,2X),F10.4)            RMS01760
 0109         180 FORMAT(1H ,6X,'INVESTMENT (MILLIONS)',44X,1X,3(F10.3,2X),              RMS01761
              1801F10.4)                                                                 RMS01762
 0110         190 FORMAT(1H ,6X,'VALUE ADDED (MILLIONS)',44X,3(F10.3,2X),F10.4)          RMS01763
 0111         200 FORMAT(1H ,6X,'CAPITAL STOCK (MILLIONS)',42X,3(F10.3,2X),F10.4)        RMS01764
 0112         210 FORMAT(1H ,6X,'EMPLOYMENT (1000 S)',46X,1X,3(F10.3,2X),F10.4)          RMS01765
 0113         220 FORMAT(1H ,6X,'ELECTRICITY USED BY MANUFACTURING INDUSTRIES (10 M RMS01766
                 1KWH)',11X,3(F10.3,2X),F10.4)                                           RMS01767
 0114         240 FORMAT(1H ,4X,'OTHER INDUSTRIES')                                      RMS01768
 0115         260 FORMAT(1H ,6X,'EMPLOYMENT (1000 S)',46X,1X,2(F10.2,2X),F10.3,2X,       RMS01769
                 1  F10.4)                                                               RMS01770
 0116         270 FORMAT(1H ,6X,'ELECTRICITY USED BY OTHER INDUSTRIES (10 M KWH)',       RMS01771
                 1  19X,3(F10.3,2X),F10.4)                                               RMS01772
 0117         290 FORMAT(1H ,4X,'REGIONAL CONSUMPTION (MILLIONS)',34X,1X,F12.3,2X,       RMS01773
              29012(F10.3,2X),F10.4)                                                     RMS01774
 0118         300 FORMAT(1H ,4X,'TOTAL PERSONAL INCOME FOR THE REGION (MILLIONS)'        RMS01775
                                                                                $
***********01)  IEY004I COMMA**************************************************************************
              300119X,F12.3,2X,2(F10.3,2X),F10.4)                                        RMS01776
 0119         310 FORMAT(1H ,4X,'TOTAL REGIONAL EMPLOYMENT (1000 S)',33X,1X,3(F10.3,RMS01777
              31012X),F10.4)                                                             RMS01778
 0120         320 FORMAT(1H ,4X,'REGIONAL UNEMPLOYMENT (PERCENT)',36X,1X,2(F10.3,2X)RMS01779
              3201,F10.4,2X,F10.4)                                                       RMS01780
 0121         330 FORMAT(1H ,4X,'TOTAL LABOR FORCE (1000 S)',41X,1X,3(F10.3,2X),         RMS01781
              3301F10.4)                                                                 RMS01782
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0122        340 FORMAT(1H ,4X,'GOVERNMENT EXPENDITURE FOR THE REGION (MILLIONS)', RMS01783
            340119X,1X,3(F10.3,2X),F10.4)                                         RMS01784
0123        350 FORMAT(1H ,4X,'GOVERNMENT REVENUE FROM THE REGION (MILLIONS)',22X,RMS01785
            35011X,3(F10.3,2X),F10.4)                                             RMS01786
0124        355 FORMAT (/,1H ,4X,'ELECTRIC POWER DEMAND' ,/)                      RMS01787
0125        360 FORMAT(1H ,6X,'TOTAL ELECTRIC CONSUMPTION FOR THE REGION (10 M  KWRMS01788
            3601S)',13X,3(F10.3,2X),F10.4)                                        RMS01789
0126        370 FORMAT(1H ,6X,'RESIDENTIAL CONSUMPTION IN THE REGION (10 M  KWH)',RMS01790
            370117X,3(F10.3,2X),F10.4)                                            RMS01791
0127        380 FORMAT(1H ,'SIC DETAIL FOR MANUFACTURING INDUSTRIES ACTIVE IN THISRMS01792
            3801 AQCR'/)                                                          RMS01793
0128        400 FORMAT(1H ,'SIC DETAIL: NO DETAIL AVAILABLE FOR THIS AQCR')       RMS01794
0129        451 FORMAT (1H ,'.....................................................RMS01795
               1.......................................................'   )      RMS01796
0130        452 FORMAT (1H ,'......            -VALUE ADDED-         .         -INRMS01797
               1VESTMENT-           .         -CAPITAL STOCK-         .'   )      RMS01798
0131        453 FORMAT (1H ,'. SIC................................................RMS01799
               1.......................................................'   )      RMS01800
0132        454 FORMAT (1H ,'.CODE. NO CONTROL.    NET   .  PERCENT . NO CONTROL. RMS01801
               1   NET   .  PERCENT . NO CONTROL.    NET   .  PERCENT .'  )       RMS01802
0133        455 FORMAT (1H ,'...... (MILLIONS).  CHANGE  .  CHANGE  . (MILLIONS). RMS01803
               1 CHANGE  .  CHANGE  . (MILLIONS).  CHANGE  .  CHANGE  .'  )       RMS01804
0134        456 FORMAT (1H ,'......            -PROFIT-              .      -NO. ORMS01805
               1F EMPLOYEES-        .  -ELECTRIC POWER CONSUMPTION-  .' )         RMS01806
0135        457 FORMAT (1H ,'...... (MILLIONS).  CHANGE  .  CHANGE  .  (1000 S) . RMS01807
               1 CHANGE  .  CHANGE  . (10 M KWH).  CHANGE  .  CHANGE  .'  )       RMS01808
0136              IF(INTT.EQ.2.AND.MIN.EQ.0.AND.IA312.EQ.1) GO TO 461             RMS01809
0137              IF(INTT.EQ.2.AND.MIN.EQ.0) GO TO 460                            RMS01810
0138              IF(IHELP.EQ.2) GO TO 500                                        RMS01811
0139              RETURN                                                          RMS01812
0140        460 WRITE (LWRIT,160)                                                 RMS01813
0141              WRITE (LWRIT,160)                                               RMS01814
0142              WRITE (LWRIT,400)                                               RMS01815
0143              RETURN                                                          RMS01816
0144        461 WRITE(LWRIT,462)                                                  RMS01817
0145        462 FORMAT(//1H ,'NO DETAILED SIC AVAILABLE FOR THIS AQCR - TOTAL MANURMS01818
               1 COSTS USED INSTEAD'/' IMPACT TRANSFERED TO REGIONAL ANALYSIS')   RMS01819
0146              RETURN                                                          RMS01820
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0147          500 WRITE (LWRIT,100)                                                RMS01821
0148              WRITE (LWRIT,160)                                                RMS01822
0149              WRITE (LWRIT,451)                                                RMS01823
0150              WRITE (LWRIT,452)                                                RMS01824
0151              WRITE (LWRIT,453)                                                RMS01825
0152              WRITE (LWRIT,454)                                                RMS01826
0153              WRITE (LWRIT,455)                                                RMS01827
0154              WRITE (LWRIT,451)                                                RMS01828
0155          530 FORMAT(1H ,1H.,I3,2H .,3(1X,F9.3,2H .,F9.3,2H .,F9.4,2H .))      RMS01829
0156              DO 600 JND = 1,19                                                RMS01830
0157              IF (INDCI(I,JND))  510,600,510                                   RMS01831
0158          510 INDI = JND+20-(1/JND)                                            RMS01832
0159              XXP =(PXD(JND)  /XX(I,JND))*100.                                 RMS01833
0160              IF (XI(I,JND))  515,515,520                                      RMS01834
0161          515 XIP = 0.0                                                        RMS01835
0162              GO TO 525                                                        RMS01836
0163          520 XIP = (PXID(JND)  /XI(I,JND))*100.                               RMS01837
0164          525 IF (XK(I,JND)) 527,527,535                                       RMS01838
0165          527 XKP = 0.0                                                        RMS01839
0166              GO TO 540                                                        RMS01840
0167          535 XKP = (PXKD(JND)  /XK(I,JND))*100.                               RMS01841
0168          540 WRITE (LWRIT,530) INDI,XX(I,JND),PXD(JND)  ,XXP,XI(I,JND),       RMS01842
                 1PXID(JND)  , XIP,XK(I,JND),PXKD(JND)  ,XKP                       RMS01843
0169          600 CONTINUE                                                         RMS01844
0170              WRITE(LWRIT,100)                                                 RMS01845
0171              WRITE(LWRIT,160)                                                 RMS01846
0172              WRITE(LWRIT,451)                                                 RMS01847
0173              WRITE(LWRIT,456)                                                 RMS01848
0174              WRITE(LWRIT,453)                                                 RMS01849
0175              WRITE(LWRIT,454)                                                 RMS01850
0176              WRITE(LWRIT,457)                                                 RMS01851
0177              WRITE(LWRIT,451)                                                 RMS01852
0178              DO 700 JND = 1,19                                                RMS01853
0179              IF (INDCI(I,JND)) 610,700,610                                    RMS01854
0180          610 INDI = JND+20-(1/JND)                                            RMS01855
0181              IF (PI(I,JND)) 615,615,620                                       RMS01856
0182          615 PIP = 0.0                                                        RMS01857
0183              GO TO 625                                                        RMS01858
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 0184          620 PIP = (PPID(JND)  /PI(I,JND))*100.                          RMS01859
 0185          625 IF (EOLD(I,JND,5)) 635,630,635                              RMS01860
 0186          630 PCT = 0.0                                                   RMS01861
 0187              GO TO 640                                                   RMS01862
 0188          635 PCT = (ED(JND,5)/EOLD(I,JND,5))*100.                        RMS01863
 0189          640 IF (SUMN(I,JND)) 645,645,650                                RMS01864
 0190          645 SUMNP = 0.0                                                 RMS01865
 0191              GO TO 655                                                   RMS01866
 0192          650 SUMNP = (PDN(JND)  /SUMN(I,JND)) *100.                      RMS01867
 0193          655 WRITE (LWRIT,530) INDI,PI(I,JND),PPID(JND),PIP,SUMN(I,JND), RMS01868
                  1  PDN(JND),SUMNP,EOLD(I,JND,5),ED(JND,5),PCT                RMS01869
 0194          700 CONTINUE                                                    RMS01870
 0195              IF (INTT.NE.2.OR.LPNTT.NE.2)  RETURN                        RMS01871
 0196              WRITE (LWRIT,100)                                           RMS01872
 0197              WRITE (LWRIT,160)                                           RMS01873
 0198              WRITE (LWRIT,451)                                           RMS01874
 0199              WRITE (LWRIT,1000)                                          RMS01875
 0200              WRITE (LWRIT,453)                                           RMS01876
 0201              WRITE (LWRIT,454)                                           RMS01877
 0202              WRITE (LWRIT,1015)                                          RMS01878
 0203              WRITE (LWRIT,451)                                           RMS01879
 0204              DO 712 JND = 1,19                                           RMS01880
 0205              IF (INDCI(I,JND))  701,712,701                              RMS01881
 0206          701 INDI = JND+20-(1/JND)                                       RMS01882
 0207              IF (POLD(I,JND,1))  703,702,703                             RMS01883
 0208          702 PCT1 = 0.0                                                  RMS01884
 0209              GO TO 704                                                   RMS01885
 0210          703 PCT1 = (PNEWD(JND,1)/POLD(I,JND,1))*100.                    RMS01886
 0211          704 IF (EOLD(I,JND,1))  706,705,706                             RMS01887
 0212          705 PCT2 = 0.0                                                  RMS01888
 0213              GO TO 707                                                   RMS01889
 0214          706 PCT2 = (ED(JND,1)/EOLD(I,JND,1))*100.                       RMS01890
 0215          707 IF (POLD(I,JND,3))  709,708,709                             RMS01891
 0216          708 PCT3 = 0.0                                                  RMS01892
 0217              GO TO 710                                                   RMS01893
 0218          709 PCT3 = (PNEWD(JND,3)/POLD(I,JND,3))*100.                    RMS01894
 0219          710 WRITE(LWRIT,530)INDI,POLD(I,JND,1),PNEWD(JND,1),PCT1,EOLD(I,JND,1)RMS01895
                  1,ED(JND,1),PCT2,POLD(I,JND,3),PNEWD(JND,3),PCT3             RMS01896
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0220          712 CONTINUE                                                        RMS01897
0221              WRITE (LWRIT,100)                                               RMS01898
0222              WRITE (LWRIT,160)                                               RMS01899
0223              WRITE (LWRIT,451)                                               RMS01900
0224              WRITE (LWRIT,1010)                                              RMS01901
0225              WRITE (LWRIT,453)                                               RMS01902
0226              WRITE (LWRIT,454)                                               RMS01903
0227              WRITE (LWRIT,1015)                                              RMS01904
0228              WRITE (LWRIT,451)                                               RMS01905
0229              DO 724 JND = 1,19                                               RMS01906
0230              IF (INDCI(I,JND))  713,724,713                                  RMS01907
0231          713 INDI = JND+20-(1/JND)                                           RMS01908
0232              IF (EOLD(I,JND,3))  715, 714, 715                               RMS01909
0233          714 PCT1 = 0.0                                                      RMS01910
0234              GO TO 716                                                       RMS01911
0235          715 PCT1 = (ED(JND,3)/EOLD(I,JND,3))*100.                           RMS01912
0236          716 IF (POLD(I,JND,4))  718,717,718                                 RMS01913
0237          717 PCT2 = 0.0                                                      RMS01914
0238              GO TO 719                                                       RMS01915
0239          718 PCT2 = (PNEWD(JND,4)/POLD(I,JND,4))  *100.                      RMS01916
0240          719 IF (EOLD(I,JND,4))  721,720,721                                 RMS01917
0241          720 PCT3 = 0.0                                                      RMS01918
0242              GO TO 722                                                       RMS01919
0243          721 PCT3 = (ED(JND,4)/EOLD(I,JND,4))*100.                           RMS01920
0244          722 WRITE (LWRIT,530)INDI,EOLD(I,JND,3),ED(JND,3),PCT1,POLD(I,JND,4), RMS01921
                 1  PNEWD(JND,4),PCT2,EOLD(I,JND,4),ED(JND,4),PCT3                RMS01922
0245          724 CONTINUE                                                        RMS01923
0246              WRITE (LWRIT,100)                                               RMS01924
0247              WRITE (LWRIT,160)                                               RMS01925
0248              WRITE (LWRIT,451)                                               RMS01926
0249              WRITE (LWRIT,1020)                                              RMS01927
0250              WRITE (LWRIT,453)                                               RMS01928
0251              WRITE (LWRIT,454)                                               RMS01929
0252              WRITE (LWRIT,1025)                                              RMS01930
0253              WRITE (LWRIT,451)                                               RMS01931
0254              DO 736 JND = 1,19                                               RMS01932
0255              IF (INDCI(I,JND))  725,736,725                                  RMS01933
0256          725 INDI = JND+20-(1/JND)                                           RMS01934
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                                                                         RMS01935
0257               IF (POLD(I,JND,5))  727,726,727                       RMS01936
0258           726 PCT1 = 0.0                                            RMS01937
0259               GO TO 728                                             RMS01938
0260           727 PCT1 = (PNEWD(JND,5)/POLD(I,JND,5))*100.              RMS01939
0261           728 IF (POLD(I,JND,2))  730,729,730                       RMS01940
0262           729 PCT2 = 0.0                                            RMS01941
0263               GO TO 731                                             RMS01942
0264           730 PCT2 = (PNEWD(JND,2)/POLD(I,JND,2))*100.              RMS01943
0265           731 IF (EOLD(I,JND,2))  733,732,733                       RMS01944
0266           732 PCT3 = 0.0                                            RMS01945
0267               GO TO 734                                             RMS01946
0268           733 PCT3 = (ED(JND,2)/EOLD(I,JND,2))*100.                 RMS01947
0269           734 WRITE (LWRIT,530)IND1,POLD(I,JND,5),PNEWD(JND,5),PCT1,POLD(I,JND, RMS01948
                 1    2),PNEWD(JND,2),PCT2,EOLD(I,JND,2),ED(JND,2),PCT3  RMS01949
0270           736 CONTINUE                                              RMS01950
0271               RETURN                                                RMS01951
0272           750 GO TO (760,770),IKSW                                  RMS01952
0273           760 BENT = BENEF/1000.                                    RMS01953
0274               WRITE(LWRIT,911) ((TITLE(IMI,JMI), IMI = 1,20), JMI = 1,2),BENT   RMS01954
0275               WRITE (LWRIT,900)                                     RMS01955
0276               GO TO 790                                             RMS01956
0277           770 WRITE (LWRIT,910)                                     RMS01957
0278           790 WRITE (LWRIT,120) (IAQCR(I,J),J=1,20) ,LPYEAR         RMS01958
0279               WRITE(LWRIT,130)                                      RMS01959
0280               WRITE(LWRIT,140)                                      RMS01960
0281               WRITE(LWRIT,150)                                      RMS01961
0282               WRITE(LWRIT,160)                                      RMS01962
               C                                                         RMS01963
               C                                                         RMS01964
0283                CALL PHELP(PI(I,20),PIN(I),PERPIN(I),PIP,PERP)       RMS01965
0284                CALL PHELP(XI(I,20),XIN(I),PERXIN(I),XIP,PERXI)      RMS01966
0285                CALL PHELP(XK(I,20),XKN(I),PERXKN(I),XKP,PERXK)      RMS01967
0286                CALL PHELP(XX(I,20),XDN(I),PERXDN(I),XXP,PERXX)      RMS01968
0287                CALL PHELP(C(I),CN(I),PERCN(I),CP,PERC)              RMS01969
0288                CALL PHELP (YY(I),YYN(I),PERYYN(I),YYP,PERYY)        RMS01970
0289                CALL PHELP(SUMN(I,20),SUMNN(I),PERSUM(I),SUMNP,PERSN)   RMS01971
0290                CALL PHELP (XNBAR(I),DNBARN(I),PERDNB(I),PNBAR,PERNB)   RMS01972
0291                CALL PHELP(XNT(I),XNN(I),PERXNN(I),XNP,PERXN)
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0292          CALL PHELP(XL(I),XLN(I),PERXLN(I),XLP,PERXL)                        RMS01973
0293          CALL PHELP(G(I),GN(I),PERGN(I),GP,PERG)                             RMS01974
0294          CALL PHELP(T(I),TN(I),PERTN(I),TP,PERT)                             RMS01975
0295          CALL PHELP(QT(I),QTN(I),PERQTN(I),QTP,PERQT)                        RMS01976
0296          CALL PHELP(QC(I),QCN(I),PERQCN(I),QCP,PERQC)                        RMS01977
0297          CALL PHELP(QM(I),QMN(I),PERQMN(I),QMP,PERQM)                        RMS01978
0298          CALL PHELP(QBAR(I),QBARN(I),PERQBR(I),QBARP,PERQB)                  RMS01979
0299          PERXN = PERSN + PERNB                                               RMS01980
0300          PERQT = PERQC + PERQM + PERQB                                       RMS01981
0301          PERXL = PERXN / .96                                                 RMS01982
        C                                                                         RMS01983
        C                                                                         RMS01984
0302      854 IF (U(I)) 858,858,856                                               RMS01985
0303      856 UP = (UN(I) / U(I)) * 100.                                          RMS01986
0304          GO TO860                                                            RMS01987
0305      858 UP = 0.0                                                            RMS01988
0306      860 CONTINUE                                                            RMS01989
0307          PERUN(I) = .04 * (1. + (UP/100.))                                   RMS01990
0308          PERUX = 4.0                                                         RMS01991
0309          UX = U(I)*100.                                                      RMS01992
0310          UXD = UN(I)*100.                                                    RMS01993
        C                                                                         RMS01994
        C                                                                         RMS01995
0311          WRITE(LWRIT,190) PERXX,XX(ICITY,20),XDN(ICITY),XXP                  RMS01996
0312          WRITE(LWRIT,170) PERP ,PI(ICITY,20),PIN(ICITY),PIP                  RMS01997
0313          WRITE(LWRIT,180) PERXI,XI(ICITY,20),XIN(ICITY),XIP                  RMS01998
0314          WRITE(LWRIT,200) PERXK,XK(ICITY,20),XKN(ICITY),XKP                  RMS01999
0315          WRITE(LWRIT,210) PERSN,SUMN(ICITY,20),SUMNN(ICITY),SUMNP            RMS02000
0316          WRITE(LWRIT,160)                                                    RMS02001
0317          WRITE(LWRIT,240)                                                    RMS02002
0318          WRITE(LWRIT,160)                                                    RMS02003
0319          WRITE(LWRIT,260) PERNB,XNBAR(ICITY),DNBARN(ICITY),PNBAR             RMS02004
0320          WRITE(LWRIT,160)                                                    RMS02005
0321          WRITE(LWRIT,300) PERYY,YY(ICITY),YYN(ICITY),YYP                     RMS02006
0322          WRITE(LWRIT,290) PERC,C(ICITY),CN(ICITY),CP                         RMS02007
0323          WRITE(LWRIT,310) PERXN,XNT(ICITY),XNN(ICITY),XNP                    RMS02008
0324          WRITE(LWRIT,320) PERUX,UX,UXD,UP                                    RMS02009
0325          WRITE(LWRIT,330) PERXL,XL(ICITY),XLN(ICITY),XLP                     RMS02010
```

```
             C      WRITE(LWRIT,340) G(ICITY), GN(ICITY), GP                                  RMS02011
 0326               WRITE(LWRIT,350) PERT,T(ICITY),TN(ICITY),TP                               RMS02012
 0327               WRITE (LWRIT,355)                                                         RMS02013
 0328               WRITE(LWRIT,360) PERQT,QT(ICITY),QTN(ICITY),QTP                           RMS02014
 0329               WRITE(LWRIT,220) PERQM,QM(ICITY),QMN(ICITY),QMP                           RMS02015
 0330               WRITE(LWRIT,270) PERQB,QBAR(ICITY),QBARN(ICITY),QBARP                     RMS02016
 0331               WRITE(LWRIT,370) PERWC,QC(ICITY),QCN(ICITY),QCP                           RMS02017
             C                                                                                RMS02018
             C                                                                                RMS02019
 0332          900 FORMAT(///,1H ,'TOTAL NET EFFECT OF ALL CONTROL STRATEGIES PURSUEDRMS02020
                  1 IN THIS RUN',/)                                                           RMS02021
 0333          910 FORMAT(///,1H ,     ' EFFECT OF 312(A) CONTROL COSTS',/)                   RMS02022
 0334          911 FORMAT(1H ,//2(20X,20A4/),42X,'BENEFIT = $',F4.1,' BILLION'/)              RMS02023
 0335         1000 FORMAT (1H ,'.......             -COST OF COAL-         .          -QUANRMS02024
                  1TITY OF COAL-       .            -COST OF OIL-          .'  )          RMS02025
 0336         1005 FORMAT(1H ;'.......($ PER TON).  CHANGE  .  CHANGE  .   (TONS)  .      RMS02026
                  1CHANGE  .  CHANGE  .(PER M GAL).  CHANGE  .  CHANGE  .'  )             RMS02027
 0337         1010 FORMAT (1H ,'.......          -QUANTITY OF OIL-        .             -CORMS02028
                  1ST OF GAS-          .          -QUANTITY OF GAS-        .'  )          RMS02029
 0338         1015 FORMAT(1H ,'....... (1000 GAL).  CHANGE  .  CHANGE  .(PER CU.FT).      RMS02030
                  1CHANGE  .  CHANGE  .(1000CU.FT).  CHANGE  .  CHANGE  .'  )             RMS02031
 0339         1020 FORMAT (1H ,'.......        -COST OF ELECTRICITY-      .             -CORMS02032
                  1ST OF COKE-         .          -QUANTITY OF COKE-       .'  )          RMS02033
 0340         1025 FORMAT(1H ,'.......(PER M KWH).  CHANGE  .  CHANGE  . (PER TON) .      RMS02034
                  1CHANGE  .  CHANGE  .   (TONS)  .  CHANGE  .  CHANGE  .'  )             RMS02035
 0341                RETURN                                                                   RMS02036
 0342                END                                                                      RMS02037
```

```
FORTRAN IV G LEVEL  20                   ABCD                 DATE = 72006          10/44/08             PAGE 000

 0001                 SUBROUTINE ABCD                                                 RMS02038
 0002                 COMMON /BUG/ ISBUG,LREAD,LWRIT                                  RMS02039
 0003                 COMMON /BUGG/ IPRN1,IPRN2,IPRN3                                 RMS02040
 0004                 IPRN1 = 1                                                       RMS02041
 0005                 IPRN2 = 1                                                       RMS02042
 0006                 IPRN3 = 1                                                       RMS02043
 0007                 ISBUG = 1                                                       RMS02044
 0008                 RETURN                                                          RMS02045
 0009                 END                                                             RMS02046
```

```
FORTRAN IV G LEVEL  20                  VALUE                DATE = 72006          10/44/08                 PAGE 0001

 0001               SUBROUTINE VALUE                                                RMS02047
 0002               COMMON /SIM/ M1,M2,MCASES,Y(1000),X(1000)                       RMS02048
                   1 ,MARK,LVAR                                                     RMS02049
 0003               GO TO(100,200,300,400,500) , MARK                               RMS02050
 0004           100 CALL VALUE1                                                     RMS02051
 0005               GO TO 1000                                                      RMS02052
 0006           200 CALL VALUE2                                                     RMS02053
 0007               GO TO 1000                                                      RMS02054
 0008           300 CALL VALUE3                                                     RMS02055
 0009               GO TO 1000                                                      RMS02056
 0010           400 CALL VALUE4                                                     RMS02057
 0011               GO TO 1000                                                      RMS02058
 0012           500 CALL VALUE5                                                     RMS02059
 0013          1000 CONTINUE                                                        RMS02060
 0014               RETURN                                                          RMS02061
 0015               END                                                             RMS02062
```

```
FORTRAN IV G LEVEL  20                  VALUE1               DATE = 72006           10/44/08                PAGE 0001
                                                                                   RMS02063
 0001              SUBROUTINE VALUE1                                               RMS02064
              C                                                                    RMS02065
 0002              COMMON /SIM/ M1,M2,MCASES,Y(1000),X(1000)                       RMS02066
                  1 ,MARK,LVAR                                                     RMS02067
 0003              COMMON /FAT/ F(1000),LSTORE,KPIST                               RMS02068
 0004              COMMON / BUG / ISBUG,LREAD,LWRIT                                RMS02069
              C                                                                    RMS02070
 0005              J = LSTORE + 1                                                  RMS02071
 0006              DO 1 I=M1,M2,LVAR                                               RMS02072
 0007              F(I) = -Y(I) + .42836*X(J) +      2.83038*Y(I+1) + .94812*Y(I+2)   RMS02073
 0008              F(I+1) = -Y(I+1) + 23.4227+ .94215*X(J+1)                       RMS02074
                  1    + X(J+2)                                                    RMS02075
 0009              F(I+2) =-Y(I+2) +  137.9922 + .613256*Y(I)                      RMS02076
                  1    + X(J+3)                                                    RMS02077
 0010            1 CONTINUE                                                        RMS02078
 0011              RETURN                                                          RMS02079
 0012              END
```

```
                                                                                                  RMS02080
 0001              SUBROUTINE VALUE2                                                              RMS02081
              C                                                                                   RMS02082
 0002              COMMON /SIM/ M1,M2,MCASES,Y(1000),X(1000)                                      RMS02083
                 1 ,MARK,LVAR                                                                     RMS02084
 0003              COMMON /FAT/ F(1000),LSTORE,KPIST                                              RMS02085
 0004              COMMON / BUG / ISBUG,LREAD,LWRIT                                               RMS02086
              C                                                                                   RMS02087
 0005              J = LSTORE                                                                     RMS02088
 0006              DO 1 I=M1,M2,LVAR                                                              RMS02089
 0007              F(I) =-Y(I) + X(J+4)*Y(I+4) + X(J+1)                                           RMS02090
 0008              F(I+1) = -Y(I+1)-13.95875 + 1.039245*Y(I)+ 361.374*Y(I+3)                      RMS02091
                 1     +X(J+7)                                                                    RMS02092
 0009              F(I+2) =-Y(I+2) + 1.8402 + ( .8377*X(J+3)) +(.1116*Y(I+3))                     RMS02093
                 1 +    X(J+6)                                                                    RMS02094
 0010              F(I+3) =-Y(I+3) + ((Y(I+1)-Y(I))/Y(I+1))                                       RMS02095
 0011              F(I+4) =-Y(I+4) + (X(J+2)/Y(I+2))                                              RMS02096
 0012            1 CONTINUE                                                                       RMS02097
 0013              RETURN                                                                         RMS02098
 0014              END
```

```
FORTRAN IV G LEVEL  20                    VALUE3               DATE = 72006           10/44/08              PAGE 0001

0001                 SUBROUTINE VALUE3                                                                RMS02099
               C                                                                                      RMS02100
0002                 COMMON /SIM/ MI,M2,MCASES,Y(1000),X(1000)                                        RMS02101
                    1 ,MARK,LVAR                                                                      RMS02102
0003                 COMMON /FAT/ F(1000),LSTORE                                                      RMS02103
0004                 COMMON / BUG / ISBUG,LREAD,LWRIT                                                 RMS02104
               C                                                                                      RMS02105
               C                                                                                      RMS02106
0005                 J = LSTORE                                                                       RMS02107
0006                 DO 1 I=MI,M2,LVAR                                                                RMS02108
0007                 F(I) = -Y(I) + .42836*X(J+3)+     2.83038*Y(I+1) + .94812*Y(I+2)                 RMS02109
0008                 F(I+1) = -Y(I+1) + 23.4227+ .94215*X(I+3)*X(J+1)                                 RMS02110
                    1    + X(J+4)                                                                     RMS02111
0009                 F(I+2) =-Y(I+2) +  137.9922 + .613256*Y(I) *X(J+2)                               RMS02112
                    1 + X(J+5)                                                                        RMS02113
0010               1 CONTINUE                                                                         RMS02114
0011                 RETURN                                                                           RMS02115
0012                 END                                                                              RMS02116
```

```
FORTRAN IV G LEVEL  20                 VALUE4              DATE = 72006          10/44/08                PAGE 0001

 0001                SUBROUTINE VALUE4                                                        RMS02117
 0002                DIMENSION A(4)                                                           RMS02118
           C                                                                                  RMS02119
 0003                COMMON /SIM/ M1,M2,MCASES,Y(1000),X(1000),MARK,LVAR,MKEEP                RMS02120
 0004                COMMON /FAT/ F(1000),LSTORE                                              RMS02121
 0005                MM = LSTORE + 1                                                          RMS02122
 0006                MT = 5 - MKEEP                                                           RMS02123
 0007                MT1 = 2*MT                                                               RMS02124
 0008                KD = MKEEP - 1                                                           RMS02125
 0009                KD1 = KD*7 + 1                                                           RMS02126
 0010                DO 20 I=M1,M2,LVAR                                                       RMS02127
 0011                II = I-MT                                                                RMS02128
 0012                MR = MM - MT1                                                            RMS02129
 0013                SUM = 0.0                                                                RMS02130
 0014                B = ALOG(Y(II+8)) - ALOG(X(MR+14))                                       RMS02131
 0015                DO 10 KK=1,KD                                                            RMS02132
 0016                K = KK - 1                                                               RMS02133
 0017                SUM = SUM + X(MM+K)*Y(I+K)                                               RMS02134
 0018                A(KK) = 1.0                                                              RMS02135
 0019                IF(X(MM+9)*X(MM+K).EQ.0.0) GO TO 9                                       RMS02136
 0020                A(KK) = (X(MM+KD)/X(MM+K))*(X(MM+K+MKEEP)/X(MM+KD1))                     RMS02137
 0021              9 CONTINUE                                                                 RMS02138
 0022                B = B - X(MM+K+MKEEP) * ALOG(A(KK))                                      RMS02139
 0023             10 F(I+K) = -Y(I+K) + A(KK)*Y(II+4)                                         RMS02140
 0024                F(II+6) = -Y(II+6) + SUM + X(MM+KD)*Y(I+KD)                              RMS02141
 0025                MM = MM - MT1                                                            RMS02142
 0026                F(II+4) =-Y(II+4) + EXP(B)                                               RMS02143
 0027                F(II+5) = -Y(II+5) + (X(MM+10)+Y(II+10))/(1.0+X(MM+11))                  RMS02144
 0028                F(II+7) = -Y(II+7) + Y(II+5)*X(MM+16)                                    RMS02145
 0029                F(II+8) =-Y(II+8)+X(MM+15)*Y(II+7)                                       RMS02146
 0030                F(II+9) = -Y(II+9) + X(MM+12)*Y(II+7)                                    RMS02147
 0031                F(II+10) = -Y(II+10) + X(MM+17)+ X(MM+13)*Y(II+9)                        RMS02148
 0032             20 CONTINUE                                                                 RMS02149
 0033                RETURN                                                                   RMS02150
 0034                END                                                                      RMS02151
```

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FORTRAN IV G LEVEL  20                 VALUES              DATE = 72006          10/44/08              PAGE 0001

 0001                SUBROUTINE VALUES                                                    RMS02152
 0002                COMMON /SIM/ M1,M2,MCASES,Y(1000),X(1000)                            RMS02153
                    1 ,MARK,LVAR                                                          RMS02154
 0003                COMMON /FAT/ F(1000),LSTORE                                          RMS02155
 0004                IT = 0                                                               RMS02156
 0005                RETURN                                                               RMS02157
 0006                END                                                                  RMS02158
```

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FORTRAN IV G LEVEL  20                DEBUG               DATE = 72006        10/44/08              PAGE 000

 0001              SUBROUTINE DEBUG(Y,MCNT,LVAR)                                        RMS02159
 0002              DIMENSION Y(1000)                                                    RMS02160
 0003              WRITE(6,21)                                                          RMS02161
 0004              MCASES = LVAR*MCNT                                                   RMS02162
 0005              K = 0                                                                RMS02163
 0006              DO 10 I=1,MCASES,LVAR                                                RMS02164
 0007              K = K + LVAR                                                         RMS02165
 0008           10 WRITE(6,20) (Y(J), J=I,K)                                            RMS02166
 0009           20 FORMAT(1H ,10F11.1)                                                  RMS02167
 0010           21 FORMAT(1H1)                                                          RMS02168
 0011              RETURN                                                               RMS02169
 0012              END                                                                  RMS02170
```

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0001             SUBROUTINE SIMUL                                                       RMS02171
           C                                                                            RMS02172
           C   MACRO MODEL SIMULATION PROGRAM I - MAINLINE                              RMS02173
           C                                                                            RMS02174
0002             DIMENSION DEL(1000)                                                    RMS02175
0003             DIMENSION IAQCR(92,20)                                                 RMS02176
0004             COMMON /SIM/ M1,M2,MCASES,Y(1000),X(1000)                              RMS02177
                1 ,MARK,LVAR                                                            RMS02178
0005             COMMON /FAT/ F(1000),LSTORE,KPIST,ARAB(10),LCHECK                      RMS02179
0006             COMMON /CAT/ A(20,20)                                                  RMS02180
0007             COMMON /SENS/ ICTAB,NBEFOR,NEWCIT                                      RMS02181
0008             COMMON / IPRIN /INTT,LPNTT  ,JYEAR,IAQCR,IJCIT                         RMS02182
0009             COMMON / BUG / ISBUG,KRD,LPR                                           RMS02183
0010             LSTORE = 0                                                             RMS02184
0011             KREP = 0                                                               RMS02185
0012         106 FORMAT(I4)                                                             RMS02186
0013             MCNT = MCASES/LVAR                                                     RMS02187
0014             LMN = LVAR                                                             RMS02188
0015             IMAX = 4                                                               RMS02189
0016             LPYEAR = JYEAR + 1969                                                  RMS02190
0017             M1 = 1                                                                 RMS02191
0018             M2 = MIN0(LMN,MCASES)                                                  RMS02192
0019           1 IT = 0                                                                 RMS02193
           C                                                                            RMS02194
0020             IX = ICTAB + LCHECK + NBEFOR                                           RMS02195
0021             IF(IX-3) 69,60,69                                                      RMS02196
0022          60 IF(NEWCIT) 71,70,71                                                    RMS02197
0023          71 I = IJCIT                                                              RMS02198
0024             WRITE(LPR,120) (IAQCR(I,J),  J=1,20),LPYEAR                            RMS02199
0025         120 FORMAT(1H1,////25X,'AQCR  ',I3,1X,19A4,5X,'FOR ',I4//25X,              RMS02200
                1 'CONVERGENCE PROCESS FOR ESTIMATED VALUES WITHOUT POLLUTION CONTRRMS02201
                1OLS')                                                                  RMS02202
0026          70 CONTINUE                                                               RMS02203
0027             WRITE(LPR,50)  MARK                                                    RMS02204
0028             IF(MARK.EQ.2) GO TO 900                                                RMS02205
0029          50 FORMAT(1H ,//4X,'*************************************************RMS02206
                1******************************************************************RMS02207
                2'/T5,'*',T120,'*'/T5,'*',25X,'SIMULTANEOUS SYSTEM NUMBER - ',I1,  RMS02208
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```
                 3 T120,'*'/T5,'*',T120,'*')                                            RMS02209
           C                                                                            RMS02210
0030             2 WRITE(LPR,9) (ARAB(J),J=1,LVAR)                                      RMS02211
0031               WRITE(LPR,10) (Y(J), J=M1,M2)                                        RMS02212
0032             9 FORMAT(1H ,T5,'*',5X,'ENDOGENOUS VAR.  ',3(5X,A4,'    CONV'),         RMS02213
                1 T120,'*')                                                             RMS02214
0033            10 FORMAT(1H ,T5,'*',8X,'ACTUAL VALUE  ',3(F9.2,8X),T120,'*')           RMS02215
0034            11 FORMAT(1H ,T5,'*',8X,'ITERATION-',I2,2X,3(F9.2,F8.5),T120,'*')       RMS02216
0035               GO TO 69                                                             RMS02217
           C                                                                            RMS02218
0036           900 CONTINUE                                                             RMS02219
0037               WRITE(LPR,99)(ARAB(J),J=1,LVAR)                                      RMS02220
0038               WRITE(LPR,910)(Y(J), J=M1,M2)                                        RMS02221
0039            99 FORMAT(1H ,T5,'*',5X,'ENDOGENOUS VAR.  ',5(5X,A4,'    CONV'),         RMS02222
                1 T120,'*')                                                             RMS02223
0040           910 FORMAT(1H ,T5,'*',8X,'ACTUAL VALUE  ',5(F9.2,8X),T120,'*')           RMS02224
0041           911 FORMAT(1H ,T5,'*',8X,'ITERATION-',I2,2X,5(F9.2,F8.5),T120,'*')       RMS02225
           C                                                                            RMS02226
0042            69 IF (IT-IMAX)  5,690,690                                              RMS02227
0043             5 IT = IT + 1                                                          RMS02228
0044             3 CALL GRADN                                                           RMS02229
0045               CALL VERT                                                            RMS02230
0046               CALL VALUE                                                           RMS02231
           C   COMPUTE NEW VALUES AND TEST FOR CONVERGENCE                              RMS02232
0047             7 IAS = IT                                                             RMS02233
0048               IT = IMAX                                                            RMS02234
0049               NN = 0                                                               RMS02235
0050               DO 4 I = M1,M2                                                       RMS02236
0051               NN = NN + 1                                                          RMS02237
0052               YY = Y(I)                                                            RMS02238
0053               Y(I) = 0.0                                                           RMS02239
0054                KK = 0                                                              RMS02240
0055               DO 40 J= M1,M2                                                       RMS02241
0056               KK = KK + 1                                                          RMS02242
0057            40 Y(I) = Y(I) - A(NN,KK)*F(J)                                          RMS02243
0058               Y(I) = YY+Y(I)                                                       RMS02244
0059               YDIS = ABS(Y(I)/YY)                                                  RMS02245
0060               YDIS = ABS(YDIS-1.)                                                  RMS02246
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 0061               DEL(I) = YDIS                                                     RMS02247
 0062               IF(YDIS.LT.0.009)GO TO 42                                         RMS02248
 0063               IT = IAS                                                          RMS02249
 0064            42 CONTINUE                                                          RMS02250
 0065             4 CONTINUE                                                          RMS02251
 0066               IF(IX.NE.3) GO TO 69                                              RMS02252
 0067           688 CONTINUE                                                          RMS02253
 0068               IF(MARK.EQ.2) GO TO 673                                           RMS02254
 0069               WRITE(LPR,11) IAS,(Y(J),DEL(J), J=M1,M2)                          RMS02255
 0070               GO TO 69                                                          RMS02256
 0071           673 WRITE(LPR,911)IAS,(Y(J),DEL(J), J=M1,M2)                          RMS02257
 0072           689 GO TO 69                                                          RMS02258
 0073           690 IF(IX.NE.3) GO TO 692                                             RMS02259
 0074           691 WRITE (LPR,105) IAS                                               RMS02260
 0075           105 FORMAT(1H ,T5,'*',T120,'*',/T5,'*',4X,'ITERATIONS TO CONVERGE=',  RMS02261
                   1 I2,T120,'*',/4X,'************************************************RMS02262
                   2******************************************************************RMS02263
                   4**')                                                              RMS02264
 0076           692 CONTINUE                                                          RMS02265
 0077               IF (M2 .EQ. MCASES) RETURN                                        RMS02266
 0078               LSTORE = LSTOKE + KPIST                                           RMS02267
 0079               M1 = M1 + LMN                                                     RMS02268
 0080               M2 = MIN0(M2+LMN,MCASES)                                          RMS02269
 0081               GO TO 1                                                           RMS02270
 0082               END                                                               RMS02271
```

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0001               SUBROUTINE GRADN                                                    RMS02272
             C                                                                         RMS02273
             C   MACRO SIMULATION I - GRADN                                            RMS02274
             C                                                                         RMS02275
0002               DIMENSION D(1000)                                                   RMS02276
0003               COMMON /SIM/ M1,M2,MCASES,Y(1000),X(1000)                           RMS02277
                  1 ,MARK,LVAR                                                         RMS02278
0004               COMMON /FAT/ F(1000),LSTORE                                         RMS02279
0005               COMMON /CAT/ A(20,20)                                               RMS02280
0006               COMMON / BUG / ISBUG,KRD,LPR                                        RMS02281
0007           106 FORMAT (1H ,I4)                                                     RMS02282
0008               NN = 0                                                              RMS02283
0009               DO 1 I = M1,M2                                                      RMS02284
0010               NN = NN + 1                                                         RMS02285
0011               XD = .00001*Y(I)                                                    RMS02286
0012               IF (XD-.00001) 4, 4, 5                                              RMS02287
0013             4 XD = .001                                                           RMS02288
0014             5 Y(I) =Y(I) + XD                                                     RMS02289
0015               CALL VALUE                                                          RMS02290
0016               DO 2 J = M1,M2                                                      RMS02291
0017             2 D(J) = F(J)                                                         RMS02292
0018               Y(I) = Y(I) - 2.0*XD                                                RMS02293
0019               CALL VALUE                                                          RMS02294
0020                KK = 0                                                             RMS02295
0021               DO 3 J = M1,M2                                                      RMS02296
0022               KK = KK + 1                                                         RMS02297
0023             3 A(KK,NN) = (D(J)-F(J))/(XD*2.)                                      RMS02298
0024             1 Y(I) = Y(I) + XD                                                    RMS02299
0025               RETURN                                                              RMS02300
0026               END                                                                 RMS02301
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FORTRAN IV G LEVEL  20                    VERT                 DATE = 72006          10/44/08              PAGE 000

 0001                SUBROUTINE VERT                                                          RMS02302
               C                                                                              RMS02303
               C   MACRO SIMULATION I - VERT                                                  RMS02304
               C                                                                              RMS02305
 0002                COMMON /SIM/ M1,M2,MCASES,Y(1000),X(1000)                                RMS02306
                    1 ,MARK,LVAR                                                              RMS02307
 0003                COMMON /CAT/ A(20,20)                                                    RMS02308
 0004                COMMON / BUG / ISBUG,KRD,LPR                                             RMS02309
 0005              7 DO 1 K=1,LVAR                                                            RMS02310
 0006                R = 1.0/A(K,K)                                                           RMS02311
 0007                A(K,K) = 1.0                                                             RMS02312
 0008                DO 2 J=1,LVAR                                                            RMS02313
 0009              2 A(K,J) = R*A(K,J)                                                        RMS02314
 0010                DO 1 I=1,LVAR                                                            RMS02315
 0011                IF (K-I) 3,1,3                                                           RMS02316
 0012              3 AIK = A(I,K)                                                             RMS02317
 0013                A(I,K) = 0.0                                                             RMS02318
 0014                DO 4 J=1,LVAR                                                            RMS02319
 0015              4 A(I,J) = A(I,J) - AIK*A(K,J)                                             RMS02320
 0016              1 CONTINUE                                                                 RMS02321
 0017                RETURN                                                                   RMS02322
 0018                END                                                                      RMS02323
```

3.0 PROGRAM IOA (INPUT-OUTPUT ANALYSIS)

3.1 Introduction

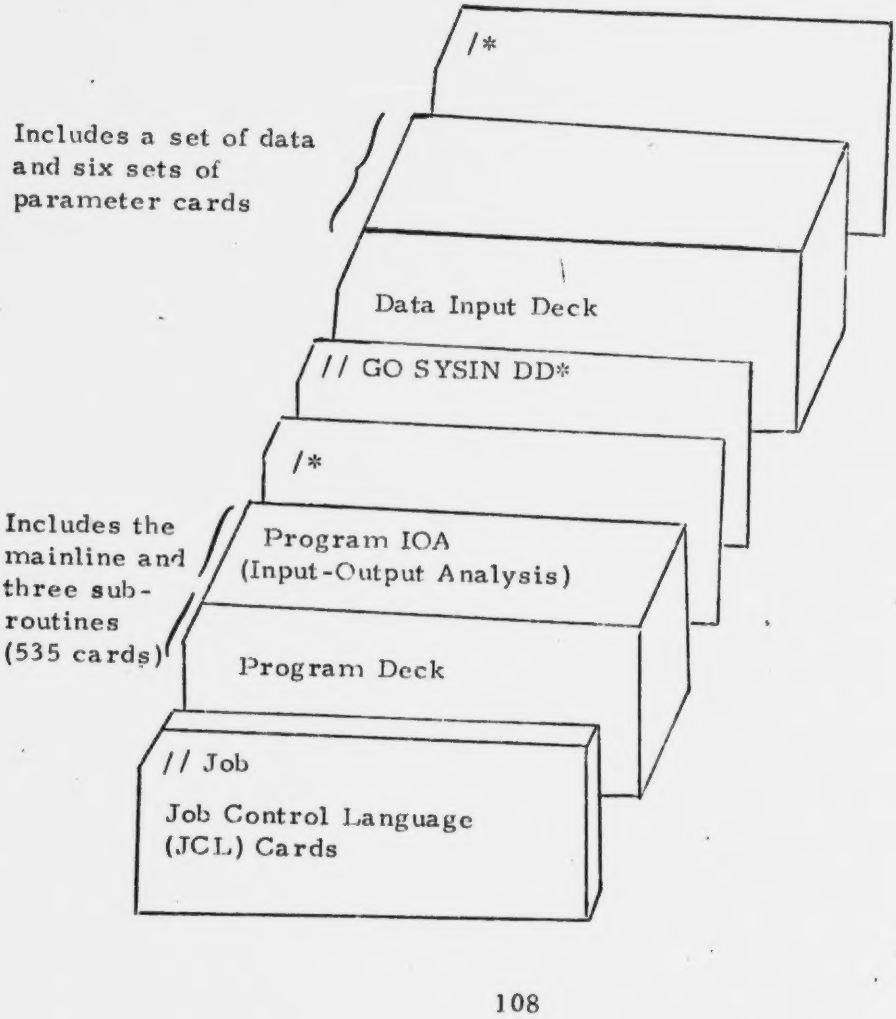
Program IOA contains a 100 sector United States input-output flow table, and is designed to conduct the following functions:

- First of all, this input-output table can be aggregated into a new table according to the number of sectors desired by the user. The maximum number of the sectors after aggregation must not exceed 49. Then the program will estimate a new input-output coefficient table and the corresponding Leontief inverse matrix.
- Take changes in the final demand by sector as the input, and calculate the changes in the gross domestic products by sector (in terms of value of shipment).
- If change in the total consumption of the United States is given, the program will estimate changes in consumtpion by sector acccording to average propensity to consume by sector stored in the program and calculate changes in the gross domestic products by sector (in terms of value of shipments).

A detailed description of input preparations and the program is provided in the following sections.

3.2 Job Deck Setup

The Program IOA (Input-Output Analysis) is a 535 statement FORTRAN program which uses approximately 184K of core and 30 seconds on the IBM 360/75.


/*
Includes a set of data and six sets of parameter cards
Data Input Deck
// GO SYSIN DD*
/*
Includes the mainline and three sub-routines (535 cards)
Program IOA (Input-Output Analysis)
Program Deck
// Job
Job Control Language (JCL) Cards

3.3 Data Input Deck

This deck includes seven sets of parameter and input data cards, a total of 1,391 cards* arranged in the following manner.

1. Original Input-Output Flow Table: 1,296 cards

   Flow table is arranged by reading the first 10 columns of the table, then the next 10 columns, etc.

Cols. 1-70	10F7.0, each card reads 10 fields, that is, first 10 columns of first row of the input-output table and then first 10 columns of second row of the table, and so on.
Cols. 73-75	I3, identification of the tenth of the column of the I-O flow table; for example, 10th, 20th, 30th, etc.
Cols. 78-80	I3, number of the row of the I-O flow table, i.e., 1, 2, 3, etc.

2. Dimension Card: 1 card

   This card specifies the matrix dimensions of the original and aggregated I-O tables.

Cols. 1-4	115, total number of columns in the original table
Cols. 5-8	108, total number of rows in the original table

The original I-O table included a detailed final demand sector, aggregation of rows or columns and some misdevious sectors.

---

*Number of cards will be changed according to the sectoring specified by the user. At present, the data input deck is prepared for a 42 sector input-output table.

Cols. 9-12	I4, total number of columns in the new I-O table. At present, it includes 42 sectors but column 43 is consumption, therefore, it is 43.
Cols. 13-16	I4, total number of rows in the new I-O table. Again, row 43 is value-added by sector, therefore, it is 43.

3. Sector Specification Card(s): 3 cards (for 42 sector table)

   Since the new I-O table is an aggregation of the original I-O table, each sector in the new table contains one or more than one sector(s) from the original table. These cards specify the number of sectors which will be aggregated into each "new" sector in the form of format (20I4). For example, if the first sector of the new table aggregates three sectors and the second sector contains two sectors from the old table, punch 3 on column 4 and 2 on column 8 and so on.

4. Sector Ordering Cards: 6 cards (for 42 sector table)

   Sectors in the original table must be lined up according to the order of the sector specification cards in the form of format (20I4). For example, if sectors 1, 4, 7 of the original table will be aggregated into the first sector of the new table, punch 1 on column 4, 4 on column 8, 7 on column 12 and so on.

5. Label Cards: 42 cards, one card for each new sector (42 sectors)

Cols. 1-28	Label of the sector

6. Change of United States Consumption Expenditures: 1 card

Cols. 1-6	F6.1 Benefit from cleaner air in terms of change in total consumption expenditures by ($ million). It will be distributed by average propensity to consume by sector.

7. Change in Final Demand by Sector: 42 cards, one card for each sector in the new I-O table

Cols. 1-10	F10.2 Change in final demand by sector, if it is a decrease of the demand, add a negative sign ($ million).

3.4 Description of the Program Deck

The program consists of a mainline and three subroutines. The cards are sequenced along the right hand edge in columns 73-80 with the prefix IOA.

The program begins by reading the input-output table (100 sectors) from the cards. The program then immediately transfers control to subroutine AGGRE. The subroutine immediately reads in the first parameter card specifying the number of rows and columns in the original I-O table and the number of rows and columns which are to be in the aggregate matrix. Following this, cards are read in which tell AGGRE how many original sectors are to be aggregated in each of the new sectors and which of the original sectors are to be aggregated into which new sectors. AGGRE then proceeds to do the actual aggregation of old sectors into new sectors. When the aggregate sectors have been computed, control is returned to the main program.

The main program now reads and prints the labels for the sectors of the new I-O table calculated by AGGRE.

The program next tabulates and prints the new I-O flow table. Next, the new I-O coefficients table is generated and printed. The program now calls subroutine MINVR which calculates the Leontief inverse matrix of the I-O table. When control is returned from MINVR, the Leontief inverse matrix and its determinant are printed. The program now reads the estimated average consumption by sector, calculates and prints each sector's share of the increased consumption. Next, a series of cards, which contain the change in final demand by sector, are read. Changes in domestic products by sector due to the air pollution control are now calculated and the resultant cost and benefit to the structure of the national economy is printed, and the program terminates.

The flow chart of Program IOA is given in Figure 3. 1 and the program listing is provided in Section 3. 5.

FIGURE 3. 1

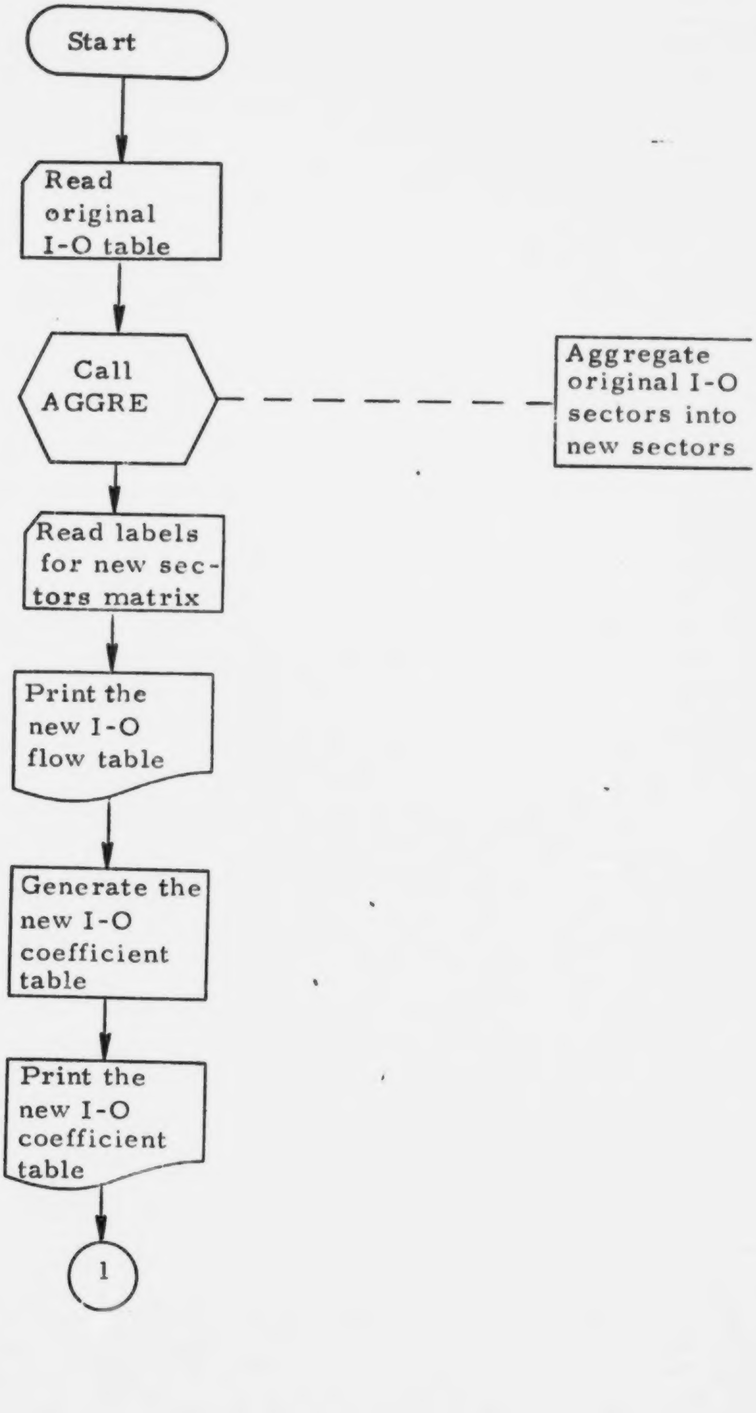
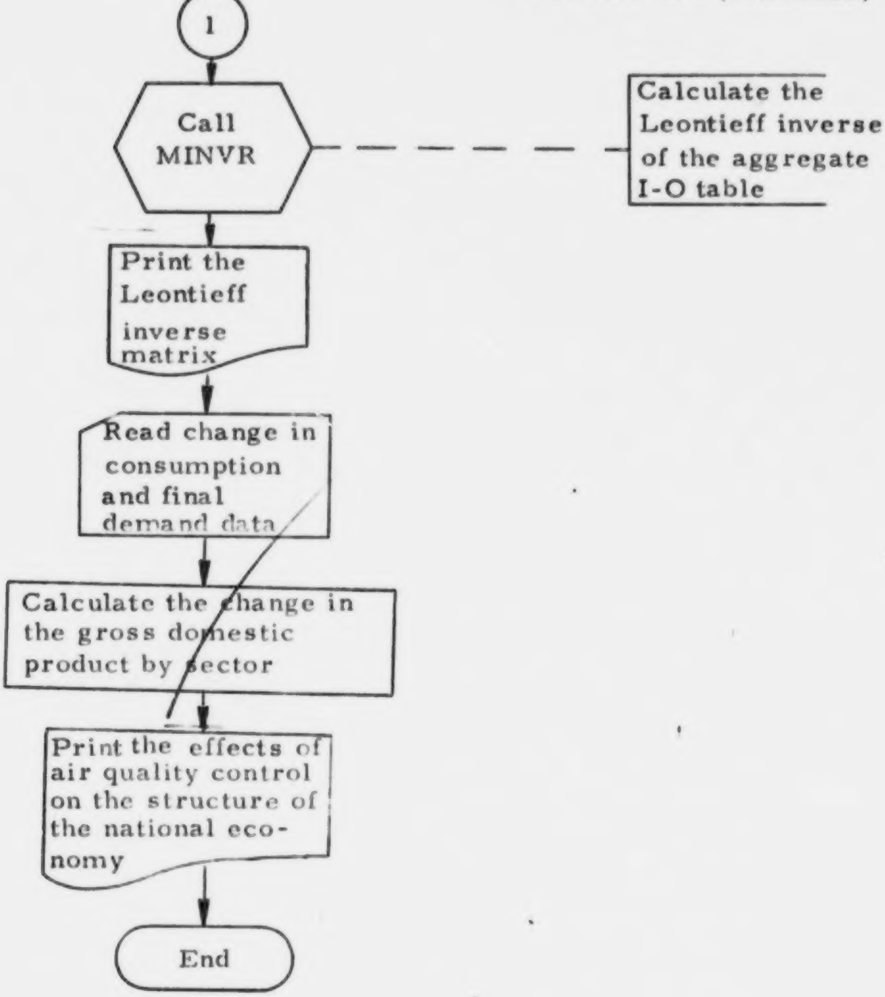

Start
Read original I-O table
Call AGGRE
Aggregate original I-O sectors into new sectors
Read labels for new sectors matrix
Print the new I-O flow table
Generate the new I-O coefficient table
Print the new I-O coefficient table
1

FIGURE 3. 1 (continued)


1
Call MINVR
Calculate the Leontieff inverse of the aggregate I-O table
Print the Leontieff inverse matrix
Read change in consumption and final demand data
Calculate the change in the gross domestic product by sector
Print the effects of air quality control on the structure of the national economy
End

3.5 Program IOA (Input-Output Analysis)

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```
*****************************************************************   IOA  001
*                                                               *   IOA  002
*                         PROGRAM IOA                           *   IOA  003
*            PREPARED BY CONSAD RESEARCH CORPORATION            *   IOA  004
*                         APRIL 1971                            *   IOA  005
*                                                               *   IOA  006
*   THIS PROGRAM READS IN THE 100X100 INPUT/OUTPUT TABLE,       *   IOA  007
*              REDUCES IT TO A SMALLER MATRIX,                  *   IOA  008
*       CALCULATES THE NEW AGGREGATE I/O COEFFICIENTS           *   IOA  009
*        AND THE CORRESPONDING LEONTIEF INVERSE MATRIX,         *   IOA  010
*          GENERATES A MODIFIED CONSUMPTION VECTOR,             *   IOA  011
*   AND ESTIMATES THE NET EFFECT OF AIR POLLUTION CONTROL       *   IOA  012
*                  ON THE NATIONAL ECONOMY                      *   IOA  013
*                                                               *   IOA  014
*****************************************************************   IOA  015
                                                                    IOA  027
100 SECTORS INCLUDED IN THE INPUT-OUTPUT TABLE                      IOA  028
                                                                    IOA  029
    1 LIVESTOCK AND LIVESTOCK PRODUCTS                              IOA  030
    2 OTHER AGRICULTURAL PRODUCTS                                   IOA  031
    3 FORESTRY AND FISHERY PRODUCTS                                 IOA  032
    4 AGRICULTURAL, FORESTRY AND FISHERY SERVICES                   IOA  033
    5 IRON AND FERROALLOY ORES MINING                               IOA  034
    6 NONFERROUS METAL ORES MINING                                  IOA  035
    7 COAL MINING                                                   IOA  036
    8 CRUDE PETROLEUM AND NATURAL GAS                               IOA  037
    9 STONE AND CLAY MINING AND QUARRYING                           IOA  038
   10 CHEMICAL AND FERTILIZER MINERAL MINING                        IOA  039
   11 RESIDENTIAL BUILDINGS                                         IOA  040
   12 PRIVATE INDUSTRIAL BUILDINGS                                  IOA  041
   13 OTHER PRIVATE NON-RESIDENTIAL BUILDINGS                       IOA  042
   14 OTHER PRIVATE CONSTRUCTION                                    IOA  043
   15 PUBLIC NON-RESIDENTIAL BUILDINGS                              IOA  044
   16 HIGHWAYS                                                      IOA  045
   17 ALL OTHER PUBLIC CONSTRUCTION                                 IOA  046
   18 MAINTENANCE AND REPAIR CONSTRUCTION                           IOA  047
   19 ORDNANCE AND ACCESSORIES                                      IOA  048
   20 MEAT PRODUCTS                                                 IOA  049
   21 DAIRY PRODUCTS                                                IOA  050
   22 CANNING, PRESERVING FRUITS, VEGETABLES, AND SEA FOODS         IOA  051
   23 GRAIN MILL PRODUCTS                                           IOA  052
   24 BAKERY PRODUCTS                                               IOA  053
   25 SUGAR                                                         IOA  054
   26 CONFECTIONERY AND RELATED PRODUCTS                            IOA  055
   27 BEVERAGE INDUSTRIES                                           IOA  056
   28 MISCELLANEOUS FOOD AND KINDRED PRODUCTS                       IOA  057
                                                                    IOA  058
```

```
29 TOBACCO MANUFACTURES                                         IOA  059
30 BROAD AND NARROW FABRICS, YARN AND THREAD MILLS              IOA  060
31 MISC. TEXTILE GOODS AND FLOOR COVERINGS                      IOA  061
32 APPAREL                                                      IOA  062
33 MISC. FABRICATED TEXTILE PRODUCTS                            IOA  063
34 LUMBER AND WOOD PRODUCTS, EXC. CONTAINERS                    IOA  064
35 WOODEN CONTAINERS                                            IOA  065
36 HOUSEHOLD FURNITURE                                          IOA  066
37 OTHER FURNITURE AND FIXTURES                                 IOA  067
38 PAPER AND ALLIED PRODUCTS, EXC. CONTAINERS                   IOA  068
39 PAPERBOARD CONTAINERS AND BOXES                              IOA  069
40 PRINTING AND PUBLISHING                                      IOA  070
41 CHEMICALS AND SELECTED CHEMICAL PRODUCTS                     IOA  071
42 PLASTICS AND SYNTHETIC MATERIALS                             IOA  072
43 DRUGS, CLEANING, AND TOILET PREPARATIONS                     IOA  073
44 PAINTS AND ALLIED PRODUCTS                                   IOA  074
45 PETROLEUM REFINING AND RELATED INDUSTRIES                    IOA  075
46 RUBBER AND MISCELLANEOUS PLASTICS PRODUCTS                   IOA  076
47 LEATHER TANNING AND INDUSTRIAL LEATHER PRODUCTS              IOA  077
48 FOOTWEAR AND OTHER LEATHER PRODUCTS                          IOA  078
49 GLASS AND GLASS PRODUCTS                                     IOA  079
50 STONE AND CLAY PRODUCTS                                      IOA  080
51 PRIMARY IRON AND STEEL MANUFACTURING                         IOA  081
52 COPPER MANUFACTURING                                         IOA  082
53 ALUMINUM MANUFACTURING                                       IOA  083
54 OTHER NONFERROUS METALS MANUFACTURING                        IOA  084
55 METAL CONTAINERS                                             IOA  085
56 HEATING, PLUMBING AND STRUCTURAL METAL PRODUCTS              IOA  086
57 STAMPINGS, SCREW MACHINE PRODUCTS AND BOLTS                  IOA  087
58 OTHER FABRICATED METAL PRODUCTS                              IOA  088
59 ENGINES AND TURBINES                                         IOA  089
60 FARM MACHINERY AND EQUIPMENT                                 IOA  090
61 CONSTRUCTION, MINING, AND OIL FIELD MACHINERY                IOA  091
62 MATERIALS HANDLING MACHINERY AND EQUIPMENT                   IOA  092
63 METALWORKING MACHINERY AND EQUIPMENT                         IOA  093
64 SPECIAL INDUSTRY MACHINERY AND EQUIPMENT                     IOA  094
65 GENERAL INDUSTRIAL MACHINERY AND EQUIPMENT                   IOA  095
66 MACHINE SHOP PRODUCTS                                        IOA  096
67 OFFICE, COMPUTING AND ACCOUNTING MACHINES                    IOA  097
68 SERVICE INDUSTRY MACHINES                                    IOA  098
69 ELECTRIC INDUSTRIAL EQUIPMENT AND APPARATUS                   IOA  099
70 HOUSEHOLD APPLIANCES                                         IOA  100
71 ELECTRIC LIGHTING AND WIRING EQUIPMENT                       IOA  101
72 RADIO, TV AND COMMUNICATION EQUIPMENT                        IOA  102
73 ELECTRIC COMPONENTS AND ACCESSORIES                          IOA  103
74 MISC. ELECTRICAL MACHINERY, EQUIPMENT AND SUPPLIES           IOA  104
75 MOTOR VEHICLES AND EQUIPMENT                                 IOA  105
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   76 AIRCRAFT AND PARTS                                                IOA  106
   77 OTHER TRANSPORTATION EQUIPMENT                                    IOA  107
   78 SCIENTIFIC AND CONTROLLING INSTRUMENTS                            IOA  108
   79 OPTICAL, OPHTHALMIC AND PHOTOGRAPHIC EQUIPMENT                    IOA  109
   80 MISCELLANEOUS MANUFACTURING                                       IOA  110
   81 TRANSPORTATION AND WAREHOUSING                                    IOA  111
   82 COMMUNICATIONS, EXC. RADIO AND TV BROADCASTING                    IOA  112
   83 RADIO AND TV BROADCASTING                                         IOA  113
   84 ELECTRIC UTILITIES                                                IOA  114
   85 GAS UTILITIES                                                     IOA  115
   86 WATER AND SANITARY SERVICES                                       IOA  116
   87 WHOLESALE AND RETAIL TRADE                                        IOA  117
   88 FINANCE AND INSURANCE                                             IOA  118
   89 REAL ESTATE AND RENTAL                                            IOA  119
   90 HOTELS, PERSONAL AND REPAIR SERVICES EXC. AUTO                    IOA  120
   91 BUSINESS SERVICES                                                 IOA  121
   92 RESEARCH AND DEVELOPMENT                                          IOA  122
   93 AUTOMOBILE REPAIR AND SERVICES                                    IOA  123
   94 AMUSEMENTS                                                        IOA  124
   95 MEDICAL, EDUCATIONAL SERVICES, AND NONPROFIT ORG.                 IOA  125
   96 FEDERAL GOVERNMENT ENTERPRISES                                    IOA  126
   97 STATE AND LOCAL GOVERNMENT ENTERPRISES                            IOA  127
   98 GROSS IMPORTS OF GOODS AND SERVICES                               IOA  128
   99 BUSINESS TRAVEL, ENTERTAINMENT, AND GIFTS                         IOA  129
  100 OFFICE SUPPLIES                                                   IOA  130
                                                                        IOA  131
      DIMENSION AK(150)                                                 IOA  016
      DIMENSION COLSU(10)                                               IOA  017
      DIMENSION B(50,50),C(22,31),SUM(31)                               IOA  018
      DIMENSION LABEL(10,50)                                            IOA  019
      DIMENSION STORE(50,3),P(50,50),S(50,50),VECTOR(50)                IOA  020
      COMMON BK(108,150)                                                IOA  021
      COMMON NARK,ITEST,IRO(50),IROW,STEP                               IOA  022
      COMMON AIN(3000),A(120,150),NC,NR,IC,IR                           IOA  023
      COMMON KRD,LPR,KP                                                 IOA  024
      EQUIVALENCE (MN,IR),(S(1,1),A(1,1)),( AK(1),VECTOR(1)),           IOA  025
     1(BK(1,1),P(1,1)),(A(51,51),STORE(1,1))                            IOA  026
      KRD = 5                                                           IOA  132
      LPR = 6                                                           IOA  133
      KP = 7                                                            IOA  134
      STEP = 0.0                                                        IOA  135
      DO 10 I=1,50                                                      IOA  136
   10 IRO(I) = I                                                        IOA  137
      IREC=0                                                            IOA  138
      MULT=10                                                           IOA  139
      IADD=9                                                            IOA  140
      JHI=1080                                                          IOA  141
      DO 20 M=1,12                                                      IOA  142
      KK=0                                                              IOA  143
      IF (M-12) 21,22,22                                                IOA  144
   22 MULT=5                                                            IOA  145
      IADD=4                                                            IOA  146
      JHI=540                                                           IOA  147
   21 DO 25 J=1,108                                                     IOA  148
      ILO=(J-1)*MULT+1                                                  IOA  149
      IHI=ILO+IADD                                                      IOA  150
   25 READ (KRD,703)  (AIN(I),I=ILO,IHI)                                IOA  151
  703 FORMAT (10F7.1)                                                   IOA  152
      DO 65 I=1,10                                                      IOA  153
   65 COLSU(I) = 0.0                                                    IOA  154
      DO 61 MAD1=1,106                                                  IOA  155
      DO 60 MAD=1,MULT                                                  IOA  156
      KK=KK+1                                                           IOA  157
   60 COLSU(MAD) = COLSU(MAD)+AIN(KK)                                   IOA  158
   61 CONTINUE                                                          IOA  159
      WRITE (LPR,800) (COLSU(JJ),JJ=1,MULT)                             IOA  160
  800 FORMAT (1X,10F10.1)                                               IOA  161
      DO 30 IM=1,MULT                                                   IOA  162
      IREC=IREC+1                                                       IOA  163
      J=0                                                               IOA  164
      DO 50 I=IM,JHI,MULT                                               IOA  165
      J=J+1                                                             IOA  166
   50 A(IREC,J) = AIN(I)                                                IOA  167
   30 CONTINUE                                                          IOA  168
   20 CONTINUE                                                          IOA  169
                                                                        IOA  170
      AGGREGATES I/O MATRIX                                             IOA  171
                                                                        IOA  172
      CALL AGGRE                                                        IOA  173
      IR1=IR - 1                                                        IOA  174
      IR2 = IR + 1                                                      IOA  175
      IR3 = IR + 2                                                      IOA  176
      IC1 = IC - 1                                                      IOA  177
      WRITE (6,4)                                                       IOA  178
    4 FORMAT(1H1,25X,'THE INDUSTRIAL SECTORS REFERED TO BY NUMBER IN THEIOA  179
     1 GENERAL'/26X,'FLOW TABLE AND THE INPUT/OUTPUT TABLE ARE DEFINED'/IOA  180
     226X,'AS FOLLOWS...'//)                                            IOA  181
      DO 3 J=1,IR1                                                      IOA  182
      READ(5,1) (LABEL(I,J), I=1,7)                                     IOA  183
    3 WRITE(6,2) (LABEL(I,J), I=1,7),J                                  IOA  184
    1 FORMAT (7A4)                                                      IOA  185
    2 FORMAT(1H ,30X,7A4,3X,'- SECTOR',I3)                              IOA  186
      WRITE (LPR,116) IR1                                               IOA  187
  116 FORMAT(1H1,40X,'GENERAL FLOW TABLE ( ',I2,' - SECTORS )'//)       IOA  188
```

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```
C
C     PRINTS OUT THE NEW GENERAL FLOW TABLE
C
      M = 0
  501 DO 601 I=1,IC
      DO 602 J=1,IR
      M = M + 1
  602 B(I,J) = AIN(M)
  601 CONTINUE
C
C      TABULATES THE COLUMN SUMS
C
      DO 603 J = 1,IC
      B(J,IR2) = 0.0
      DO 603 I = 1,IR1
  603 B(J,IR2) = B(J,IR2) + B(J,I)
      B(IC,IR) = 0.0
C
      IROW = IR2
      ITEST = IC
      STEP = 0
      CALL PRINT(B)
C
C
C     GENERATES THE AGGREGATE I/O TABLE
C
      WRITE(LPR,655) IR1
  655 FORMAT(1H1,35X,'INPUT/OUTPUT TABLE (',I2,' - SECTORS)'//)
      DO 606 N=1,IC
      CON = B(N,IR) + B(N,IR2)
      B(N,IR3) = 0.0
      IF(CON)6,606,6
    6 DO 607 I=1,IR
      B(N,I) = B(N,I)/CON
  627 B(N,IR3) = B(N,IR3) + B(N,I)
  607 CONTINUE
      B(N,IR2) = B(N,IR2)/CON
  606 CONTINUE
C
      IROW = IR3
      ITEST = IC
      STEP = 1
      CALL PRINT (B)
      WRITE(6,6666) IR1,IR1,IR1,IR1
 6666 FORMAT(//45X, 'NOTE..ROW-',I2,'+1 = VALUE ADDED (PERCENTAGE)'
     1   /51X,'ROW-',I2,'+2 = INTERMEDIATE PRODUCT (PERCENTAGE, SUM OF R
     2OWS 1-',I2,')'/51X,'ROW-',I2,'+3 = TOTAL')
```

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```
C
C
C     THE LEONTIEF INVERSE
C
      WRITE(LPR,742) IR1
  742 FORMAT(1H1,21X,'THE LEONTIEF INVERSE MATRIX OF THE INPUT/OUTPUT TA
     1BLE (',I3,' SECTORS )'//)
      DO 7701 I=1,IC1
      DO 7702 J = 1,IC1
 7702 B(I,J) = -B(I,J)
 7701 B(I,I) = 1.0 & B(I,I)
C
      MA = IC1
      DETA = 0.0
      CALL MINVR (B,MA,DETA)
      WRITE (LPR,773) DETA
  773 FORMAT(1H ,'DETERMINANT=',F12.10)
      IROW = IC1
      ITEST = IC1
      STEP = 1.0
      CALL PRINT(B)
C
C     MODIFIED CONSUMPTION VECTOR
C        CON = ESTIMATED MARGINAL INCREASE IN CONSUMPTION
C        B(IC,2) = PERCENTAGE CONSUMPTION OF EACH SECTOR
C        AK(I) = EACH SECTORS SHARE OF THE INCREASED CONSUMPTION
C
  111 FORMAT(F6.1)
      READ(KRD,111) CON
      WRITE(6,647) CON
  647 FORMAT(1H1,38X,' CONSUMPTION BY SECTOR'/25X,
     1'BENEFIT - CHANGE IN CONSUMPTION '
     1'=',F6.1,' MILLION DOLLARS'//35X,'PERCENT',7X,'MILLION DOLLARS',5X
     2'SECTOR DEFINITION')
      DO 643 I=1,IR1
      AK(I) = CON*B(IC,I)
  643 WRITE(6,644) I,B(IC,I),AK(I),(LABEL(J,I), J=1,7)
  644 FORMAT(18X,'SECTOR-',I2,F14.6,8X,F10.2,8X,7A4)
C
C      MULTIPLIES THE LEONTIEF INVERSE BY
C        1. MODIFIED CONSUMPTION VECTOR
C        2. CONTROL COST VECTOR
C
      MN = IR1
      STEP = 2
      IROW = IR
      ITEST = IR
```

```
C                                                                       IOA  283
      MARK = 1                                                          IOA  284
      GO TO 444                                                         IOA  285
 1000 MARK = MARK + 1                                                   IOA  286
      WRITE(6,777)                                                      IOA  287
  777 FORMAT(1H1,25X,'AIR POLUTION CONTROL COST - CHANGE IN FINAL DEMANDIOA  288
     1'//)                                                              IOA  289
      READ(5,11) (VECTOR(J), J=1,MN)                                    IOA  290
   71 FORMAT(30X,'SECTOR-',I2,F11.3,4X,7A4)                             IOA  291
   11 FORMAT(F10.2,70X)                                                 IOA  292
      DO 7777 J=1,MN                                                    IOA  293
      WRITE(6,71) J,VECTOR(J),(LABEL(I,J), I=1,7)                       IOA  294
 7777 CONTINUE                                                          IOA  295
  444 CONTINUE                                                          IOA  296
      DO 23 IK = 1,MN                                                   IOA  297
      STORE(IK,MARK) = 0.0                                              IOA  298
      DO 23 J=1,MN                                                      IOA  299
      S(J,IK) = B(J,IK) * VECTOR(J)                                     IOA  300
      STORE(IK,MARK) = STORE(IK,MARK) + S(J,IK)                         IOA  301
   23 CONTINUE                                                          IOA  302
      IF(MARK-1) 32,31,32                                               IOA  303
   32 WRITE(6,33)                                                       IOA  304
   33 FORMAT(1H1,20X,' AIR POLUTION CONTROL. EFFECT OF COST ON STRUCTUREIOA  305
     1 OF NATIONAL ECONOMY'//)                                          IOA  306
      GO TO 34                                                          IOA  307
                                                                        IOA  308
   31 WRITE(6,35)                                                       IOA  309
   35 FORMAT(1H1,20X,' AIR POLUTION CONTROL. BENEFICIAL EFFECT ON STRUCTIOA  310
     1URE  OF NATIONAL ECONOMY'//)                                      IOA  311
      DO 36 ICT = 1,MN                                                  IOA  312
      DO 36 ICP = 1,MN                                                  IOA  313
   36 P(ICT,ICP) = S(ICT,ICP)                                           IOA  314
   34 CALL PRINT (S)                                                    IOA  315
      IF(MARK-2) 1000,37,2000                                           IOA  316
   37 MARK = 3                                                          IOA  317
      DO 38 I=1,MN                                                      IOA  318
      STORE(I,3) = STORE(I,1) + STORE(I,2)                              IOA  319
      DO 38 J=1,MN                                                      IOA  320
   38 S(I,J) = P(I,J) + S(I,J)                                          IOA  321
      WRITE(6,330)                                                      IOA  322
  330 FORMAT(                  1H1,30X,' AIR POLUTION CONTROL. NET EFFECIOA  323
     1T ON STRUCTURE OF NATIONAL ECONOMY'//)                            IOA  324
      GO TO 34                                                          IOA  325
 2000 CONTINUE                                                          IOA  326
   81 FORMAT(1H1,20X,'SUMMARY OF EFFECT OF AIR POLUTION CONTROL ON STRUCIOA  327
     1TURE OF NATIONAL ECONOMY'/50X,'(IN MILLIONS)'//                   IOA  328
     2                               29X,2(3X,'EFFECT OF'),7X,'NET'/29X,IOA  329
```

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```
      23X,' BENEFIT ',3X,'   COST',7X,'EFFECT'/)                        IOA  330
      DO 2222 K=1,3                                                     IOA  331
 2222 STORE(IR2,K) = 0.0                                                IOA  332
      WRITE(6,81)                                                       IOA  333
      DO 222 I=1,NN                                                     IOA  334
      WRITE (6,44) I,(STORE(I,MARK),MARK=1,3),(LABEL(J,I),J=1,7)        IOA  335
      DO 222 K=1,3                                                      IOA  336
      STORE(IR2,K) = STORE(IR2,K) + STORE(I,K)                          IOA  337
  222 CONTINUE                                                          IOA  338
      WRITE(6,4444) (STORE(IR2,MARK),MARK=1,3)                          IOA  339
   44 FORMAT(20X,'SECTOR-',I2,3F12.2,5X,7A4)                            IOA  340
 4444 FORMAT(24X,'TOTAL',3F12.2)                                        IOA  341
                                                                        IOA  342
      STOP                                                              IOA  343
      END                                                               IOA  344
      SUBROUTINE AGGRE                                                  IOA  345
      DIMENSION B(150),JCOM(100),KCOM(150)                              IOA  346
      COMMON BK(108,150)                                                IOA  347
      COMMON MARK,ITEST,IRO(50),IROW,STEP                               IOA  348
      COMMON AIN(3000),A(120,150),NC,NR,IC,IR                           IOA  349
      COMMON KRD,LPR,KP                                                 IOA  350
  PROGRAM ASSUMES MATRIX TO BE AGGREGATED HAS BEEN READ IN AND STORED   IOA  351
  BY COLUMNS ON DISK AND ALSO THAT THE DEFINE FILE CARDS                IOA  352
  IN THE MAIN PROGRAM ARE AS FOLLOWS                                    IOA  353
  NC = TOTAL = OF COLUMNS IN INPUT MATRIX                               IOA  354
  NR = TOTAL = OF ROWS IN INPUT MATRIX                                  IOA  355
  IC = TOTAL = OF COLUMNS IN OUTPUT MATRIX                              IOA  356
  IR = TOTAL = OF ROWS IN OUTPUT MATRIX                                 IOA  357
                                                                        IOA  358
     ** WARNING ** THE LAST ROW IN THE OUTPUT MATRIX MUST BE            IOA  359
                   108 (VALUE ADDED) IN THE INPUT TBL.  THE LAST COLUMN IOA  360
                   IN THE OUTPUT MATRIX MUST BE COLUMN 108              IOA  361
                   (CONSUMPTION) IN THE INPUT MATRIX.                   IOA  362
      READ (KRD,700)  NC,NR,IC,IR                                       IOA  363
      WRITE (LPR,700) NC,NR,IC,IR                                       IOA  364
      DO 5 I = 1,IC                                                     IOA  365
      DO 5 J = 1,NR                                                     IOA  366
      BK(I,J) = 0.0                                                     IOA  367
    5 CONTINUE                                                          IOA  368
  700 FORMAT (20I4)                                                     IOA  369
      IF (IC-IR) 11,10,10                                               IOA  370
   10 IMAX=IC                                                           IOA  371
      NMAX=NC                                                           IOA  372
      GO TO 12                                                          IOA  373
   11 IMAX=IR                                                           IOA  374
      NMAX=NR                                                           IOA  375
                                                                        IOA  376
```

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```
12 READ (KRD,700) (JCOM(I),I=1,IMAX)
   READ (KRD,700) (KCOM(I),I=1,NMAX)
   K=0
   DO 30 I=1,IC
   JJ=JCOM(I)
   DO 35 J=1,JJ
   K=K+1
   IREC=KCOM(K)
   DO 36 L=1,NR
36 BK(I,L) = BK(I,L)&A(IREC,L)
35 CONTINUE
30 CONTINUE
   ITOP = IR*IC
   DO 41 I=1,ITOP
41 AIN(I) = 0.0
   M=0
   DO 40 I=1,IC
   K=0
   DO 40 J=1,IR
   JJ=JCOM(J)
   M=M+1
   DO 43 L=1,JJ
   K=K+1
   IF(K-108) 48,47,47
47 WRITE(6,49) K
49 FORMAT(1H1,'ERROR...TRIED TO ADD ROW-',I3,' AND THERE ARE ONLY 108
  1'/1X,'MEANINGFUL ROWS IN THE INITIAL I/O TABLE'//)
   STOP
48 CONTINUE
   KK=KCOM(K)
43 AIN(M) = AIN(M)&BK(I,KK)
40 CONTINUE
C  OUTPUT MATRIX ARRANGED IN AIN BY COLUMNS
C  RETURN TO MAIN PROGRAM TO WRITE  AGGREGATED MATRIX
   RETURN
   END
   SUBROUTINE PRINT(B)
   DIMENSION B(50,50)
   COMMON BK(108,150)
   COMMON MARK,ITEST,IRO(50),IROW,STEP
   COMMON AIN(3000),A(120,150),NC,NR,IC,IR
   COMMON KRD,LPR,KP
700 FORMAT (1H ,7X,9(5X,'COL',I3)      )
702 FORMAT (1X,'ROW',I3,2X,10F11.0)
705 FORMAT (1X,'ROW',I3,2X,10F11.4)
703 FORMAT (1X,'ROW',I3,2X,10F11.7)
704 FORMAT(10F8.6)
```

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```
      IK = 1                                                            IOA  424
      MARK = (ITEST&8)/9                                                IOA  425
      DO 802 J=1,MARK                                                   IOA  426
      IJ = J*9                                                          IOA  427
      IF(IJ - ITEST)805,804,804                                         IOA  428
  804 IJ = ITEST                                                        IOA  429
  805 WRITE (LPR,700) (IRO(I),I=IK,IJ)                                  IOA  430
      IF(STEP-1.0)333,332,334                                           IOA  431
  333 DO 801 M=1,IROW                                                   IOA  432
  801 WRITE (LPR,702) IRO(M),(B(I,M),I=IK,IJ)                           IOA  433
      GO TO 99                                                          IOA  434
  334 DO 822 M=1,IROW                                                   IOA  435
  822 WRITE(LPR,705) IRO(M),(B(I,M), I=IK,IJ)                           IOA  436
      GO TO 99                                                          IOA  437
  332 DO 811 M=1,IROW                                                   IOA  438
      WRITE (LPR,703) IRO(M),(B(I,M),I=IK,IJ)                           IOA  439
  811 CONTINUE                                                          IOA  440
   99 CONTINUE                                                          IOA  441
      IK = IJ & 1                                                       IOA  442
      WRITE (LPR,701)                                                   IOA  443
  802 CONTINUE                                                          IOA  444
  701 FORMAT(1H1)                                                       IOA  445
      RETURN                                                            IOA  446
      END                                                               IOA  447
      SUBROUTINE  MINVR (A,MA,DETA)                                     IOA  448
      DIMENSION A(50,50),IR(50),IC(50)                                  IOA  449
      COMMON BK(108,150)                                                IOA  450
      COMMON MARK,ITEST,IRO(50),IROW,STEP                               IOA  451
      COMMON AIN(3000),D(120,150),NC,NR,ID,IK                           IOA  452
      COMMON KRD,LPR,KP                                                 IOA  453
      DO1I=1,MA                                                         IOA  454
      IR(I)=0                                                           IOA  455
    1 IC(I)=0                                                           IOA  456
      DETA = 1.0                                                        IOA  457
      TOL = .000001                                                     IOA  458
      S=0.0                                                             IOA  459
      R=MA                                                              IOA  460
C     *BEGIN*                                                           IOA  461
    2 I=0                                                               IOA  462
      J=0                                                               IOA  463
      TEST=0.0                                                          IOA  464
      DO 25 K=1,MA                                                      IOA  465
      IF(IR(K))25,39,25                                                 IOA  466
   39 CONTINUE                                                          IOA  467
      DO 24 L=1,MA                                                      IOA  468
      IF(IC(L))24,38,24                                                 IOA  469
   38 CONTINUE                                                          IOA  470
```

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```
      X=ABS(A(K,L))                                                     IOA  471
      IF(X-TEST)24,37,37                                                IOA  472
   37 CONTINUE                                                          IOA  473
      I=K                                                               IOA  474
      J=L                                                               IOA  475
      TEST=X                                                            IOA  476
   24 CONTINUE                                                          IOA  477
   25 CONTINUE                                                          IOA  478
C                                                                       IOA  479
C        THIS IS THE TEST FOR A DEPENDENT TOLERANCE                     IOA  480
C                                                                       IOA  481
      IF(TOL)73,74,74                                                   IOA  482
   73 TOL=ABS(TOL*TEST)                                                 IOA  483
   74 CONTINUE                                                          IOA  484
C                                                                       IOA  485
C $    *END* SUBMXS $$                                                  IOA  486
C                                                                       IOA  487
      PIV=A(I,J)                                                        IOA  488
      DETA=PIV*DETA                                                     IOA  489
      IF(ABS(PIV)-TOL)17,17,35                                          IOA  490
   35 CONTINUE                                                          IOA  491
      IR(I)=J                                                           IOA  492
      IC(J)=I                                                           IOA  493
      PIV=1.0/PIV                                                       IOA  494
      A(I,J)=PIV                                                        IOA  495
      DO5K=1,MA                                                         IOA  496
      IF(K-J)36,5,36                                                    IOA  497
   36 A(I,K) = A(I,K)*PIV                                               IOA  498
    5 CONTINUE                                                          IOA  499
      DO9K=1,MA                                                         IOA  500
      IF(K-I)33,9,33                                                    IOA  501
   33 CONTINUE                                                          IOA  502
      PIV1=A(K,J)                                                       IOA  503
    6 DO8L=1,MA                                                         IOA  504
      IF(L-J)31,8,31                                                    IOA  505
   31 A(K,L) = A(K,L) - PIV1*A(I,L)                                     IOA  506
    8 CONTINUE                                                          IOA  507
    9 CONTINUE                                                          IOA  508
      DO11K=1,MA                                                        IOA  509
      IF(K-I)32,11,32                                                   IOA  510
   32 A(K,J) = -PIV*A(K,J)                                              IOA  511
   11 CONTINUE                                                          IOA  512
      S=SS1.0                                                           IOA  513
      IF(S-R)2,12,12                                                    IOA  514
   12 DO16I=1,MA                                                        IOA  515
      K=IC(I)                                                           IOA  516
      M=IR(I)                                                           IOA  517
      IF(K-I)41,16,41                                           IOA  518
   41 CONTINUE                                                  IOA  519
      DETA=-DETA                                                IOA  520
      DO14L=1,MA                                                IOA  521
      TEMP=A(K,L)                                               IOA  522
      A(K,L)=A(I,L)                                             IOA  523
   14 A(I,L)=TEMP                                               IOA  524
      DO15L=1,MA                                                IOA  525
      TEMP=A(L,M)                                               IOA  526
      A(L,M)=A(L,I)                                             IOA  527
   15 A(L,I)=TEMP                                               IOA  528
      IC(M)=K                                                   IOA  529
      IR(K)=M                                                   IOA  530
   16 CONTINUE                                                  IOA  531
      LEAVE WITH A WARNING OF ERROR                             IOA  532
   17 INVER = S                                                 IOA  533
      RETURN                                                    IOA  534
      END                                                       IOA  535
```

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4.0 PROGRAM FBE (Feedback Effects)

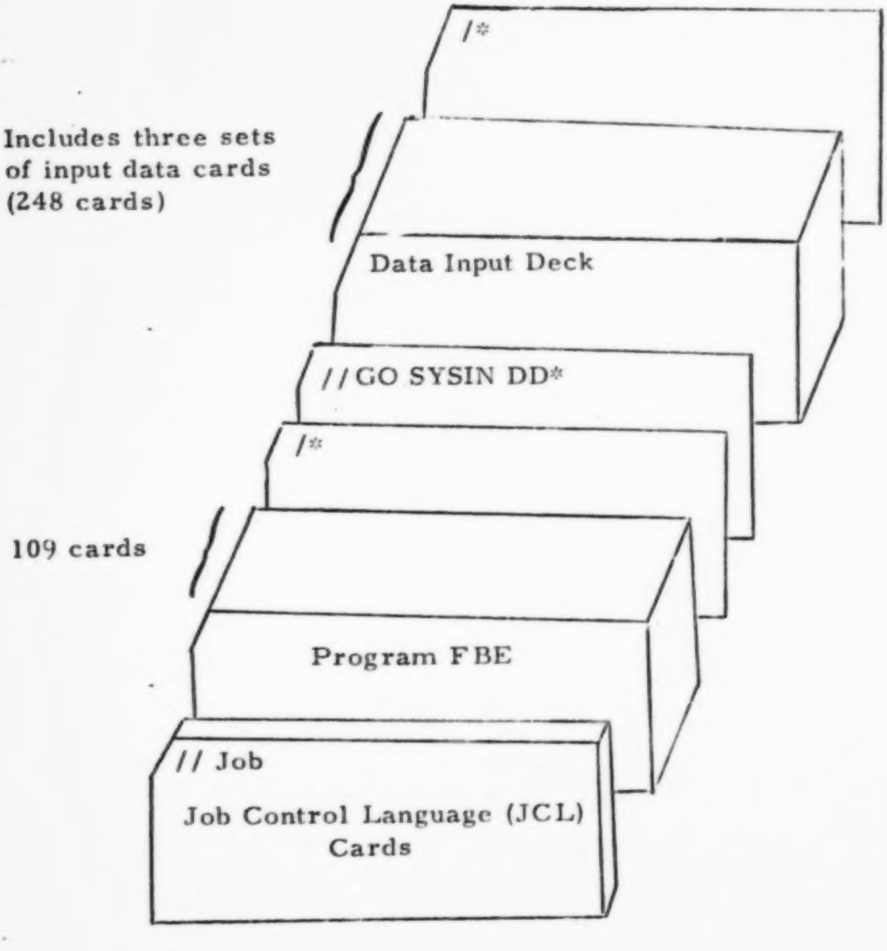
4.1 Introduction

Program FBE contains a regional market share matrix developed in Appendix D of Volume I of CONSAD's May 15 Report. The purpose of the program is to take the output from Program IOA and then distribute the interregional feedback to each AQCR. These interregional feedbacks are measured in terms of changes in value-added by two-digit SIC detail for manufacturing industries. Output from Program FBE also punches a deck of cards which will be part of input deck to the Program RMS to be used for simulation option 8 as described before.

Detailed specifications of the program preparation is given in the following sections.

4.2 Job Deck Set-Up

The Program FBE (Feedback Effect) is a 109 statement FORTRAN program which uses approximately 60K of core.


/*
Includes three sets of input data cards (248 cards)
Data Input Deck
//GO SYSIN DD*
/*
109 cards
Program FBE
// Job
Job Control Language (JCL) Cards

4.3 Data Input Deck

This deck includes three sets of input data cards, a total of 248 cards, arranged in the following manner.

1. The ratio of value-added/value of shipment by sector for 42 sectors under consideration (6 cards)

   Format: 8F10.4

2. Output from Program IOA, 42 cards, containing the cost and benefit effects of air quality control measured by changes in value of shipments by sector (one card/sector).

Cols. 1-10	F10.4, benefit effects
Cols. 11-20	F10.4, cost effects

3. The regional market share matrix, 200 cards, contains the share of national value-added by industry for each of the 100 AQCRs under consideration.

   First 100 cards contain market share of first 11 two-digit SICs by AQCR (SIC 20-30) (one card for each AQCR).

Cols. 1-5	I5, AQCR code
Cols. 6-10	F5.4, share for industry 20
Cols. 11-15	F5.4, share for industry 21
Cols. 16-20	F5.4, share for industry 22
Cols. 21-25	F5.4, share for industry 23
Cols. 26-30	F5.4, share for industry 24
Cols. 31-35	F5.4, share for industry 25
Cols. 36-40	F5.4, share for industry 26
Cols. 41-45	F5.4, share for industry 27
Cols. 46-50	F5.4, share for industry 28
Cols. 51-55	F5.4, share for industry 29
Cols. 56-60	F5.4, share for industry 30

   The second 100 cards contain market share of second nine two-digit SICs by AQCR (SIC 31-39) (one card for each AQCR)

Cols. 1-5	I5, AQCR code
Cols. 6-10	F5.4, share for industry 31
Cols. 11-15	F5.4, share for industry 32
Cols. 16-20	F5.4, share for industry 33
Cols. 21-25	F5.4, share for industry 34
Cols. 26-30	F5.4, share for industry 35
Cols. 31-35	F5.4, share for industry 36
Cols. 36-40	F5.4, share for industry 37
Cols. 41-45	F5.4, share for industry 38
Cols. 46-50	F5.4, share for industry 39

4.4 Description of the Program Deck

Program FBE is a FORTRAN program consisting of 109 statement cards. The cards are sequenced along the right hand edge (columns 73-80) with the prefix FBE.

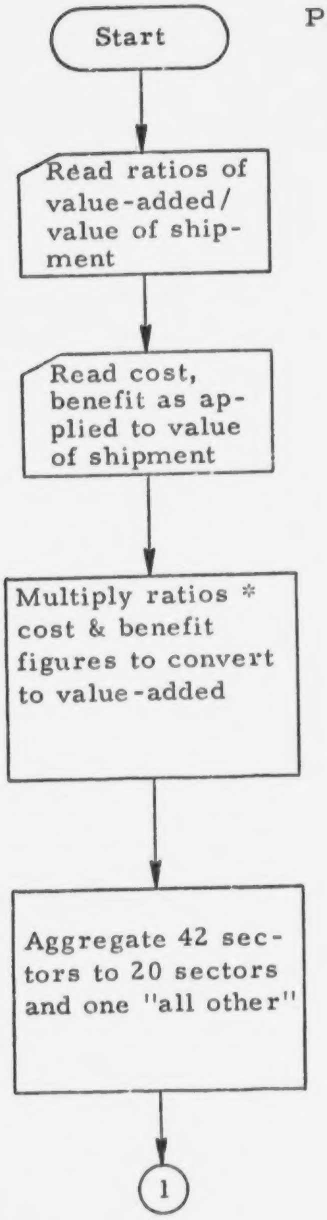
The program begins by reading in data set one (the ratio of value-added/value of shipment). Immediately thereafter the cards produced by IOA (cost and benefit effects of air quality control) are read. The program then multiplies the cost and benefit for each sector by its respective ratio of value-added/shipment in order to convert the value of shipment by sector from Program IOA to value-added.

The next section of the program aggregates the 42 cost and benefit figures calculated above into 20 two-digit SICs and one "all other" industry classification. The program now punches and writes output cards containing (1) the benefit and cost to "all other" industries (1 card), and (2) the cost and benefit to the 20 two-digit SICs (20 cards).

Next the program reads in the regional market share matrix (data set 3). The program processes one AQCR at a time for the next set of calculations. For each AQCR, the cost and benefit for each two-digit SIC is multiplied by the share for that AQCR/SIC combination in order to determine the cost and/or benefit effect associated with industry in that AQCR. The net effect is calculated as the sum of the cost and benefit figures.

When all 100 AQCRs have been processed, the program punches card and writes output in three steps. First, the cost effect by AQCR is punched and written, seven two-digit SICs per card (or line) followed by the AQCR code. Thus, three cards are punched for each AQCR. The format used is (7F10.4, 3X, I3). (300 cards)

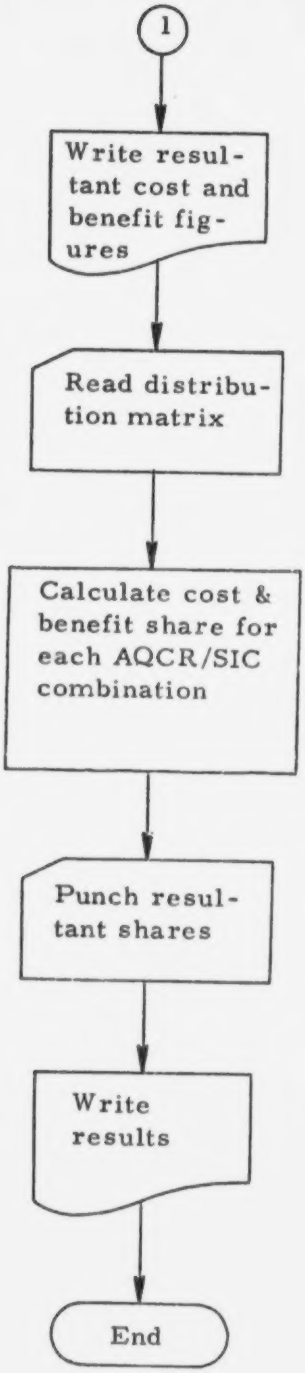
Second, a deck, identical in size and format, containing the benefit effect is punched and the output for benefit written. Finally, the deck containing the net figures is punched and written, and the program terminates.



FLOW CHART OF PROGRAM FBE

Start
Read ratios of value-added/ value of shipment
Read cost, benefit as applied to value of shipment
Multiply ratios * cost & benefit figures to convert to value-added
Aggregate 42 sectors to 20 sectors and one "all other"
1

FLOW CHART OF
PROGRAM FBE
(continued)


1
Write resultant cost and benefit figures
Read distribution matrix
Calculate cost & benefit share for each AQCR/SIC combination
Punch resultant shares
Write results
End

4.5 Program FBE (Feedback Effect)

```
C     *************************************************************
C     *                                                           *
C     *                     PROGRAM FBE                           *
C     *          PREPARED BY CONSAD RESEARCH CORPORATION          *
C     *                     APRIL 1971                            *
C     *                                                           *
C     *   THIS PROGRAM CONTAINS A REGIONAL MARKET SHARE MATRIX    *
C     *     AND CALCULATES THE INTERREGIONAL FEEDBACK EFFECT      *
C     *                     TO 100 ADCR                           *
C     *                                                           *
C     *************************************************************
      DIMENSION X(42), Y(42), Z(42), V(2), COST(20),BENE(20)
      DIMENSION DISTEB(100,20), DISTBA(100,20)
      DATA COST, BENE / 20*0.0, 20*0.0 /
      DIMENSION DISTBC(100,20)
      DATA V / 2 * 0.0 /
   10 FORMAT(8F10.4)
      READ (5,10) (X(I), I = 1,42)
      DO 20 I = 1,42
      READ(5,10) Y(I), Z(I)
      Y(I) = Y(I) * X(I)
      Z(I) = Z(I) * X(I)
   20 CONTINUE
      DO 30 I = 1,9
      V(1) = V(1) + Y(I)
   30 V(2) = V(2) + Z(I)
      COST(1) = Z(10)
      BENE(1) = Y(10)
      COST(2) = Z(11)
      BENE(2) = Y(11)
      COST(3) = .5 * Z(12)
      BENE(3) = .5 * Y(12)
      COST(4) = .5 * Z(12)
      BENE(4) = .5 * Y(12)
      DO 40 I = 13,21
      J = I - 8
      COST(J) = Z(I)
      BENE(J) = Y(I)
   40 CONTINUE
      DO 50 I = 22,25
      COST(14) = COST(14) + Z(I)
      BENE(14) = BENE(14) + Y(I)
   50 CONTINUE
      DO 60 I = 26,29
      J = I - 11
      COST(J) = Z(I)
      BENE(J) = Y(I)
```

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```
 60 CONTINUE                                                    FRE  048
    COST(18) = Z(29) + Z(30)                                    FRE  049
    BENE(18) = Y(29) + Y(30)                                    FRE  050
    DO 70 I = 31,32                                             FRE  051
    J = I - 12                                                  FRE  052
    COST(J) = Z(I)                                              FRE  053
    BENE(J) = Y(I)                                              FRE  054
 70 CONTINUE                                                    FRE  055
    DO 80 I = 33,42                                             FRE  056
    V(1) = V(1) + Y(I)                                          FRE  057
    V(2) = V(2) + Z(I)                                          FRE  058
 80 CONTINUE                                                    FRE  059
    WRITE (6,90) V                                              FRE  060
 90 FORMAT(1H ,2F10.3)                                          FRE  061
    DO 110 I = 1,20                                             FRE  062
    J = I + 19                                                  FRE  063
    WRITE(7,100) COST(I),BENE(I), J                             FRE  064
    WRITE(6,90) COST(I), BENE(I)                                FRE  065
100 FORMAT(2F10.3,50X,I2)                                       FRE  066
110 CONTINUE                                                    FRE  067
    DO 120 I = 1,100                                            FRE  068
    READ(5,115) (DISTRB(I,J), J = 1,11)                         FRE  069
115 FORMAT(5X,11F6.4)                                           FRE  070
120 CONTINUE                                                    FRE  071
    DO 130 I = 1,100                                            FRE  072
    READ(5,115) (DISTRB(I,J), J = 12,20)                        FRE  073
    DO 125 J = 1,20                                             FRE  074
    DISTRA(I,J) = DISTRB(I,J) * BENE(J)                         FRE  075
    DISTRB(I,J) = DISTRB(I,J) * COST(J)                         FRE  076
    DISTRC(I,J) = DISTRA(I,J) + DISTRB(I,J)                     FRE  077
125 CONTINUE                                                    FRE  078
130 CONTINUE                                                    FRE  079
    DO 150 I = 1,100                                            FRE  080
    WRITE(6,140) DISTRB(I,1), (DISTRB(I,J), J = 2,8), I         FRE  081
    WRITE(7,145) DISTRB(I,1), (DISTRB(I,J), J = 2,8), I         FRE  082
    WRITE(6,140) (DISTRB(I,J), J = 9,15), I                     FRE  083
    WRITE(7,145)(DISTRB(I,J), J = 9,15), I                      FRE  084
    WRITE(6,142) (DISTRB(I,J), J = 16,20), I                    FRE  085
    WRITE(7,147) (DISTRB(I,J), J = 16,20), I                    FRE  086
150 CONTINUE                                                    FRE  087
    DO 160 I = 1,100                                            FRE  088
    WRITE(6,140) DISTRA(I,1), (DISTRA(I,J), J = 2,8), I         FRE  089
    WRITE(7,145) DISTRA(I,1), (DISTRA(I,J), J = 2,8), I         FRE  090
    WRITE(6,140) (DISTRA(I,J), J = 9,15), I                     FRE  091
    WRITE(7,145) (DISTRA(I,J), J = 9,15), I                     FRE  092
    WRITE(6,142) (DISTRA(I,J), J = 16,20), I                    FRE  093
    WRITE(7,147) (DISTRA(I,J), J = 16,20), I                    FRE  094
```

```
160 CONTINUE                                                            FBE  095
     DO 170 I = 1,100                                                   FBE  096
     WRITE(6,140) DISTRC(I,1), (DISTRC(I,J), J = 3,8), I                FBE  097
     WRITE(7,145) DISTRC(I,1), (DISTRC(I,J), J = 3,8), I                FBE  098
     WRITE(6,140) (DISTRC(I,J), J = 9,15), I                            FBE  099
      WRITE(7,145)(DISTRC(I,J), J = 9,15), I                            FBE  100
     WRITE(6,142) (DISTRC(I,J), J = 16,20), I                           FBE  101
     WRITE(7,147) (DISTRC(I,J), J = 16,20), I                           FBE  102
170 CONTINUE                                                            FBE  103
140 FORMAT(1H ,7F10.4,3X,I3)                                            FBE  104
145 FORMAT(7F10.4,3X,I3)                                                FBE  105
142 FORMAT(1H ,5F10.4,23X,I3)                                           FBE  106
147 FORMAT(5F10.4,23X,I3)                                               FBE  107
     STOP                                                               FBE  108
     END                                                                FBE  109
```

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APPENDIX

EPA CONTROL COST ESTIMATES

The control costs used in this report are the preliminary estimates corresponding to the control implied by Clean Air Amendment of 1970, provided by EPA for this study. These estimates are termed as EPA cost estimates in the report. However, the EPA cost estimates are given in the form of national estimates by industry category. The control costs by AQCR were then estimated by the production capacity of the corresponding industry and use of electricity in each AQCR in proportion to the national estimates of control costs.

The EPA cost estimates reflect the air pollution control of stationary sources for five pollutants, namely, particulates, oxides of sulfur, carbon monoxide, hydrocarbon, and oxides of nitrogen. The stationary sources covered in these estimates are:*

Industrial Process	
Grain Milling and Handling	SIC2042
Kraft Pulp	SIC2611
Nitric Acid	
Sulfuric Acid	SIC2819
Phosphate	SIC2871
Petroleum Refining & Storage	SIC2911
Asphalt Batching	SIC2951
Cement	SIC3241
Gray Iron Foundries	SIC3321
Iron and Steel	SIC3323
Primary Copper	SIC3331
Primary Lead	SIC3332
Primary Zinc	SIC3333
Primary Aluminum	SIC3334
Secondary Non-ferrous Metals	SIC3341
Stationary Combustion	
Electric Power	
Other Stational Combustion	
Solid Waste	

---

* See Table 3.3, Volume I of this report.

Regional cost estimates are, in general, calculated by the production capacity of each four-digit SIC industrial categories in each AQCR in proportion to national production capacity of the corresponding industries. The measurement of regional production capacity is based on the value-added definitions of OBE.

Thus:

$$C_{ijt} = C^N_{jt} \cdot \frac{V_{ijt}}{V^N_{jt}}$$

where C_{ijt} is control cost of industry j in year t in ith AQCR

C^N_{jt} is control cost of industry j in year t in the nation

V_{ijt} is the value-added of industry j in year t in ith AQCR

V^N_{jt} is the value-added of industry j in year t in the nation

Ideally, such cost estimates should be based on four-digit SIC industry categories. However, in some occasions, a three-digit or two-digit production capacity estimate (that is V_{ijt}/V^N_{jt}) has been used, because, in some AQCRs, 4- or 3-digit information is not available to the public. *

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* There is a disclosure problem of making available any industrial data in the census publication unless at least 4 or more plants are located in the same geographic unit in order to protect each individual firm in the defined area.

Regional control costs of steam electricity were estimated by total usage of electricity in the region rather than production capacity Besides industrial usage, the residential use of electricity was also estimated in proportion to population.

Other stationary combusion and solid waste costs were allocated to each AQCR according to manufacturing production capacity to the nation.